

**SONY®**

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COLOR VIDEO CAMERA

**DXC-637/637P**

ZOOM LENS

**VCL-916BYA**

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**SERVICE MANUAL**

Vol. 1 (1st Edition)

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**Hyper HAD™**

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Components identified by shading and  $\triangle$  marked on the schematic diagrams and parts list are critical to safe operation. Replace these components with SONY parts whose part numbers appear as shown in this manual or in supplements published by SONY.

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# SECTION 1 OPERATING INSTRUCTION

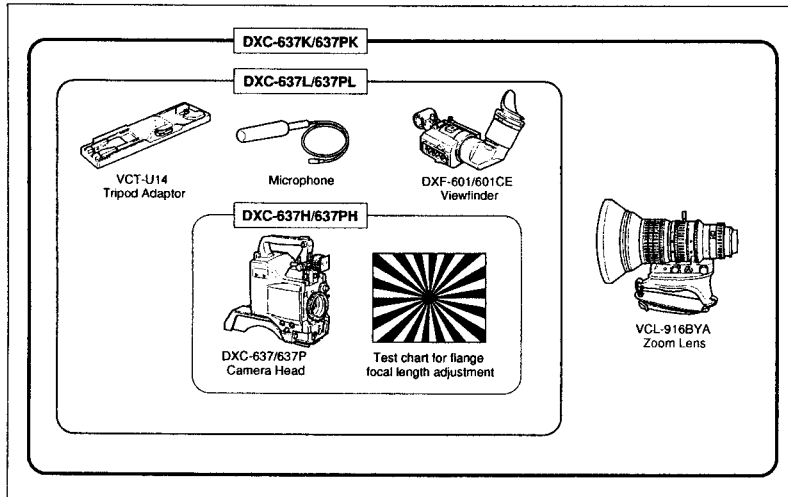
This section is extracted from  
operation manual.



## Product Configurations

The six models, DXC-637K, DXC-637L, DXC-637H, DXC-637PK, DXC-637PL, and DXC-637PH, comprise both NTSC and PAL versions and the

components as shown in the figure below. The operation of the basic camera unit is the same in all cases.



### Camera adaptor

The product kit does not include a camera adaptor: to use a camera adaptor, you will need to purchase a model CA-537/537P or CA-327/327P.

## Preparations for Use

### Important Notes on Operation

#### Fitting the zoom lens

It is important to fit the lens correctly, as otherwise damage may result. Be sure to refer to the section "Fitting the Lens" (See page 19).

#### Power supply

Use only the specified 12 V DC power supply.

#### Do not disassemble the unit

The internal mechanism of the camera is of precision construction. Touching internal parts may cause a malfunction.

There are dangerously high voltages present within the viewfinder, and touching internal components could cause an electric shock accident.

#### Keep foreign objects out of the unit

If metal objects or liquids get inside the unit, they could cause a malfunction or accident.

#### Do not cover the unit while operating

Putting a cloth, for example, over the unit can cause excessive internal heat build-up.

#### Operation and storage

Avoid storing or operating the unit in the following conditions.

- In excessive heat or cold (operating temperature range:  $-10^{\circ}\text{C}$  to  $+45^{\circ}\text{C}$  ( $14^{\circ}\text{F}$  to  $113^{\circ}\text{F}$ )) Remember that in summer in warm climates the temperature inside a car with the windows closed can easily exceed  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ).
- In damp or dusty locations
- Locations where the unit may be exposed to rain
- Locations subject to violent vibration
- Close to radio or TV transmitters producing strong electromagnetic fields.

#### Viewfinder

- Do not leave the camera with the eyepiece pointing directly at the sun.

The eyepiece lens can concentrate the sun's rays and melt the interior of the viewfinder.

- Do not use the viewfinder close to strong magnetic fields. This can cause picture distortion.

#### Shipping

Use the optional LC-421 Carrying Case for optimal shipping.

If sending the camera by truck, ship, air or other transportation service, first store it in the carrying case, then pack the carrying case in the supplied carton (or an equivalent).

#### Care of the unit

Remove dust and dirt from the surfaces of the lenses or optical filters using a blower.

If the body of the camera is dirty, clean it with a soft, dry cloth. In extreme cases, use a cloth steeped in a little neutral detergent, then wipe dry. Do not use organic solvents such as alcohol or thinners, as these may cause discoloration or other damage to the finish of the unit.

#### In the event of operating problems

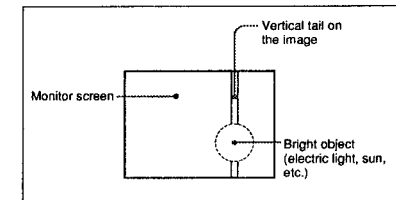
If you should experience problems with the unit, contact your supplier or Sony service representative.

### Characteristics of CCD Sensors

The following effects may appear in the image. They are characteristic of cameras using CCDs (charge-coupled devices), and do not indicate a malfunction.

#### Vertical smear

When shooting a very bright object, such as a light, the highlight tends to produce vertical tails. This effect is much reduced in this camera.



#### White flecks

If the camera is operated at a high temperature, white flecks may appear in the image.

## Features

### Picture Quality

**Signal-to-noise ratio 63 dB (NTSC)/61 dB (PAL)**

The camera gives a clear picture with very low noise levels.

**Horizontal resolution of 800 TV lines**

The 420,000-pixel imaging element pushes CCD technology to the limits of quality.

**DCC+ (dynamic contrast control - plus)**

This feature improves on the conventional DCC feature (preventing white breakup when shooting a high intensity subject), further preventing color faults in high intensity subjects.

**Digital image enhancer**

The digital implementation of the outline compensation function provides a stable picture, with reduced aliasing<sup>1)</sup> and spurious modulation<sup>2)</sup>.

**High sensitivity (f/8.0, 3200 K, 2000 lux)**

This allows poorly lit scenes, even under candlelight, to be shot.

**White shading<sup>3)</sup> compensation circuit**

This is adjusted to the state of the camera when shipped.

**Flare compensation circuit**

When shooting a bright subject, this prevents graying or color casts in dark portions of the picture.

**Ideal gamma compensation curve**

This provides high detail quality, with no loss of quality in hair tones and other dark parts of the picture.

**"Clean detail" circuit**

This prevents "jaggies" on diagonal lines.

### High Functionality

**"Easy mode" for instant operation**

This allows you to shoot immediately when there is insufficient time to check the camera settings, with automatic adjustment to standard settings.

**"Easy focus" function**

You can set the focus accurately and easily before shooting.

**Programmable gain**

You can choose the gain values assigned to the H, M and L settings of the GAIN switch from the following: -3 dB, 0 dB, 3 dB, 6 dB, 9 dB, 12 dB, 18 dB and 24 dB.

**Hyper gain**

A single switch operation raises the gain by a factor of about 60 with respect to 0 dB (that is, increased to 36 dB).

**Auto tracing white balance function**

Even if the lighting conditions change continuously, the white balance automatically follows. This is useful when there is no time to adjust the white balance, or when shooting while moving indoors or outdoors.

**Auto iris compensation for backlighting or spotlighting**

When using the auto iris function, it is possible to automatically compensate the iris adjustment for backlit or spotlight scenes.

**Dual pixel readout function**

When the gain setting is 18 dB or 24 dB, this function lets you raise the gain to double (6 dB up), without increasing the noise level.

## Features

**Three-position color matrix**

You can switch the color matrix among three settings to change the picture color adjustment.

**Recording time display**

You can display either of the following recording time indications:

- The total recording time so far
- The recording time for the current cut

**Viewfinder super detail**

The video signal for the viewfinder can be mixed with a V-DTL (vertical detail) signal, for easy focusing.

**Two selectable indication levels for the zebra pattern**

You can select the reference level for the zebra pattern indication at an IRE image level of either 65% to 75% or 100% and above.

**Color temperature indications**

After the white balance is set, the color temperature appears in the viewfinder.

**Video output with character information**

You can output video to an external monitor with the same character information as shown on the viewfinder screen.

**Camera microphone output indication**

An indication (μ) appears in the viewfinder when there is an output signal from the camera microphone.

**Reference signal (1 kHz) output**

With the color bars, you can output a 1 kHz reference signal.

**Shoulder pad position adjustment**

You can adjust the shoulder pad position front to back for optimal balance for shoulder operation.

**High performance viewfinder (DXF-601/601CE)**

- Horizontal resolution of 600 TV lines
- Large aperture, allowing a picture check even when your eye is away from the viewfinder
- Variable peaking
- Rugged aluminum die-cast body

### VTR Information Display

When a PVV-3/3P is connected, you can display the following information from the VTR in the viewfinder.

- Time data (time code, CTL count, or user bit value)
- VTR audio levels
- Remaining tape time
- VTR operating state
- Remaining battery capacity (when using an Anton Bauer Intelligent Battery System)

1) **Aliasing (moiré):** this produces jagged patterns when the subject has a fine mesh pattern. These are also known as moiré patterns.

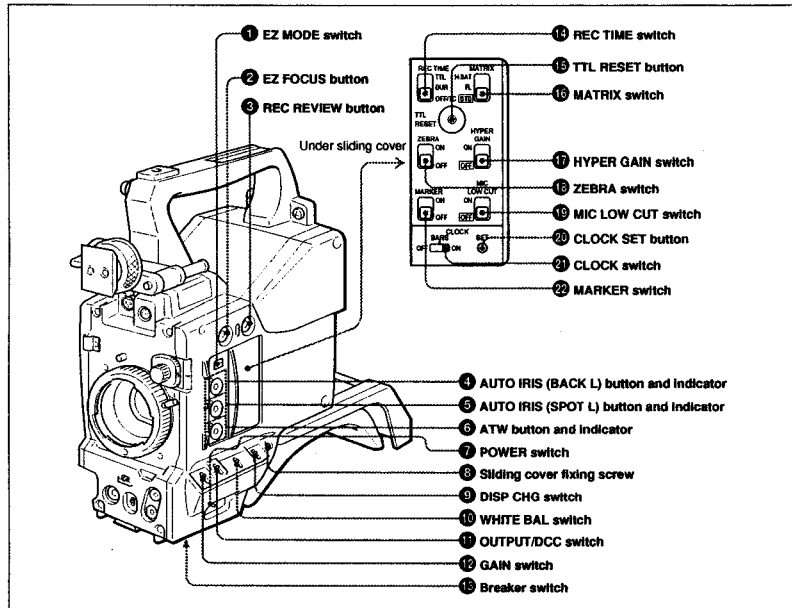
2) **Spurious modulation (ghosts):** these are duplicate or triplicate images of a bright subject when shot in dark surroundings.

3) **White shading:** this causes variation in the color of a white subject away from the center of the screen.

## Location and Function of Parts

### Camera Head

#### Right side view



#### 1 EZ ("easy") MODE switch

Set this switch to the ON position when you want to be able to shoot immediately, with automatic adjustment of the camera settings to standard values. (See page 40.) When this function is used, the iris and the white balance are adjusted automatically. Moving this switch to the OFF position returns the camera to the previous settings.

#### 2 EZ FOCUS button

Press this button to turn the "easy focus" function on. This opens the iris, to make it easier to focus before beginning shooting. The indication "EZ FOCUS" appears in the viewfinder while the function is on; to turn it off, press the EZ FOCUS button again. If left on, the function automatically turns off after about ten seconds.

#### Note

If the "easy focus" function is still on when you press the VTR button, it turns off automatically and recording starts about one second later.

## Location and Function of Parts

#### 3 REC (recording) REVIEW button

Press this button to review the last few seconds of the recording in the viewfinder. (See page 32.)

#### 4 AUTO IRIS (BACK L) (backlighting) button and indicator

To make the image lighter when shooting against the light in the automatic iris adjustment mode, press this button, turning the indicator on.

#### 5 AUTO IRIS (SPOT L) (spotlighting) button and indicator

To make the image clearer when shooting a subject lit by a spotlight in the automatic iris adjustment mode, press this button, turning the indicator on.

#### 6 ATW (auto tracing white balance) button and indicator

Press this button, turning the indicator on, when you want the white balance to be adjusted automatically to follow changes in lighting conditions. (See page 43.)

#### 7 POWER switch

This powers the camera on and off. There are two different ON settings as follows.

**ON STBY:** This puts the VTR on standby. In this state, pressing the VTR button on the camera head, the lens or a camera adaptor starts recording immediately.

**ON SAVE:** This puts the VTR in the power-saving state, with the video head drum stationary. In this state, it takes a few seconds to start recording after pressing the VTR button.

#### Note

The VTR state when this switch is in the ON STBY or ON SAVE position may depend on the VTR model.

#### 8 Sliding cover fixing screw

To fix the sliding cover closed, loosen and push this screw up, then tighten it.

#### 9 DISP CHG (display change) switch

This is used for changing settings in the viewfinder menus (basic menus and advanced menus). (See the section "Adjustments and Settings" (page 43).)

#### 10 WHITE BAL (white balance) switch

This selects the white balance setting from the preset value, the value in memory A or the value in memory B. (See page 43.)

#### 11 OUTPUT/DCC (dynamic contrast control) switch

This switch turns the dynamic contrast control function on and off, and also provides for color bar output.

**CAM/DCC ON:** This enables the dynamic contrast control function, which prevents highlight burnout when shooting a high-intensity subject. In this position, setting "DCC+" to ON in the advanced menus allows you to use the DCC+ function. (See page 40.) Normally leave the switch in this position.

**CAM/DCC OFF:** This disables the dynamic contrast control function. (The contrast gradation in image portions where the video output level does not exceed 100% is correctly maintained.)

**BARS/DCC OFF:** This outputs a color bar signal.

#### 12 GAIN switch

This selects one of the three gain settings, high, medium or low. You can choose the gain values assigned to the H, M and L settings from values from -3 dB to 24 dB. (See page 38.) The factory default selections are 18 dB (H), 9 dB (M) and 0 dB (L).

#### Note

When the HYPER GAIN switch is in the ON position, the GAIN switch has no effect.

#### 13 Breaker switch

If there is a fault in the camera power supply, the breaker trips, and the camera power supply is disconnected. Correct the fault in the power supply, then press this switch.

#### 14 REC (recording) TIME switch

This selects the recording time indication in the viewfinder.

**TTL:** Displays the total recording time.

The total recording time is not reset even when you stop the VTR and power off the camera, for example, to replace the battery pack.

#### Note

The total recording time is reset if you power off the camera while the VTR is recording.

**DUR:** Displays the recording time of the current cut.  
**OFF/TC:** Switches off the recording time display.

If, however, a PVV-3/3P is connected, and in the advanced menus you set the time code display item (TC IND) to ON (see page 42), then the VTR time data (time code, CTL count, or user bit value) is displayed.

**Note**

The recording time displayed when this switch is set to the TTL or DUR position is obtained by counting the duration of the tally signal input to the camera. The value may not agree exactly with the value derived from the time code values. Furthermore, the value displayed may not be correct when another manufacturer's VTR is connected to the camera.

**15 TTL (total) RESET button**

Pressing this button resets the total recording time (TTL selection) to zero.

**16 MATRIX switch**

This switch selects the color matrix setting to change the picture color adjustment.

**H.SAT:** Colors are emphasized.

**FL:** Colors appear normal even when shooting under fluorescent lighting.

**STD:** The color matrix in standard setting is used.

Normally leave the switch in this position.

**17 HYPER GAIN switch**

Setting this switch to the ON position increases the gain by a factor of about 60 with respect to 0 dB (a 30 dB increase by electronic amplification and a 6 dB increase for DPR, bringing about a total gain increase of 36 dB).

When this switch is in the ON position, the indication "HYPER" appears in the viewfinder, and the GAIN UP indicator in the viewfinder also lights.

When finished shooting, return this switch to the OFF position. The "HYPER" indication disappears and the GAIN UP indicator goes off.

**Note**

Increasing the gain with this switch reduces the horizontal resolution by 50%.

**18 ZEBRA switch**

Set this switch to the ON position to display a zebra pattern (diagonal stripes) in the viewfinder.

Depending on the zebra level setting in the advanced menus (see page 40) the zebra pattern appears in portions with a video output level of either 65% to 75% or 100% and above.

**19 MIC LOW CUT switch**

Set this switch to the ON position to insert a high-pass filter in the microphone circuit, reducing wind noise. Normally leave the switch in the OFF position.

**20 CLOCK SET button**

This is used when setting the internal clock. (See page 48.)

**21 CLOCK switch**

This selects the clock indication in the viewfinder as well as the camera video output.

**ON:** The date and time appear.

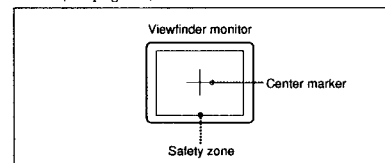
**BARS:** The date and time appear only when displaying the color bars.

**OFF:** The date and time do not appear.

This switch is also used when setting the internal clock and for recording the date and time. (See page 48.)

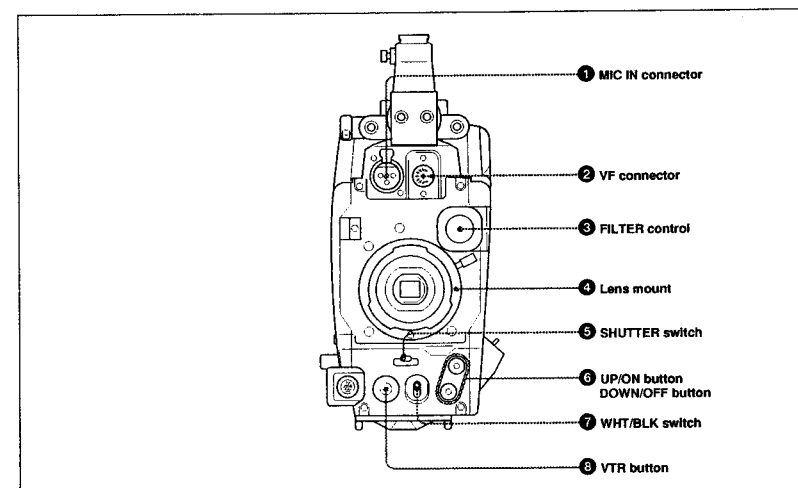
**22 MARKER switch**

Set this switch to the ON position to display the center marker and/or safety zone, as selected in the advanced menus (see page 40).



## Location and Function of Parts

### Front view



**1 MIC (microphone) IN connector (XLR 3-pin, female)**

Connect the supplied microphone or an optional microphone (operable with a 48 V supply).

**2 VF (viewfinder) connector (8-pin)**

Connect the viewfinder connector.

**3 FILTER control**

Select the color temperature conversion filter appropriate to the lighting conditions. (See page 31.)

**4 Lens mount**

Attach the zoom lens here.

**5 SHUTTER switch**

This switch is used for setting the electronic shutter and the clear scan function. (See page 47.)

Normally leave the switch in the OFF position.

**6 UP/ON button and DOWN/OFF button**

These buttons are used together with the DISP CHG switch for changing settings in the viewfinder menus. (See the section "Adjustments and Settings" (page 43)).

For the viewfinder normal indications, these buttons are used to set whether or not to show the LOW LIGHT indication (see page 35) when the lighting is insufficient. Press the UP/ON button to show the indication or DOWN/OFF button not to show the indication. The setting is indicated as the L.L. IND item in advanced menu 3 (see page 41).

**7 WHT/BLK (white/black) switch**

This switch is used for automatic adjustment of the white balance and black balance. (See pages 43 to 46.)

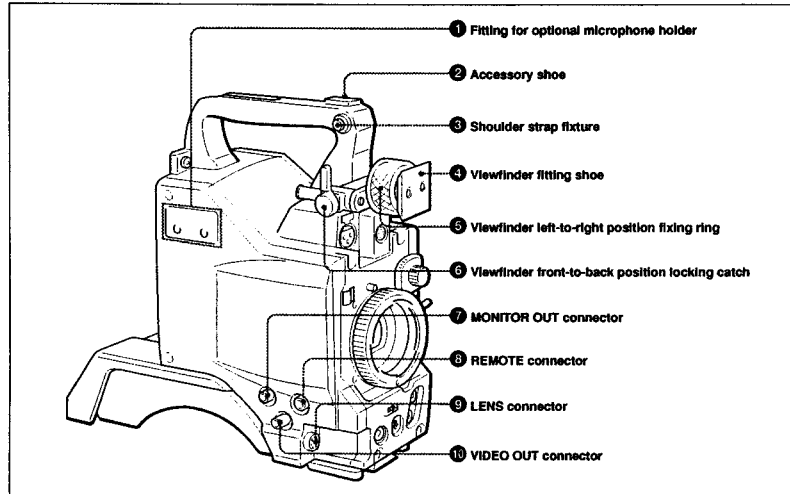
**8 VTR button**

Pressing this button starts and stops recording on the VTR.





## Left and upper view



**① Fitting for optional microphone holder**  
You can fit an optional CAC-12 Microphone Holder here. (See page 22.)

**② Accessory shoe**  
Attach optional video lights or other accessories here.

**③ Shoulder strap fixture**  
To use the supplied shoulder strap, fix one end here and the other end to the VTR.

**④ Viewfinder fitting shoe**  
Fix the DXF-601/601CE Viewfinder here.

**⑤ Viewfinder left-to-right position fixing ring**  
Loosen this ring to adjust the left-to-right position of the viewfinder. (See page 21.)

**⑥ Viewfinder front-to-back position locking catch**  
Release this catch to adjust the front-to-back position of the viewfinder. (See page 21.)

**⑦ MONITOR OUT connector (phono jack)**  
Outputs both the camera video and the character information as displayed on the viewfinder screen. You can connect an optional LCD color monitor to this jack.

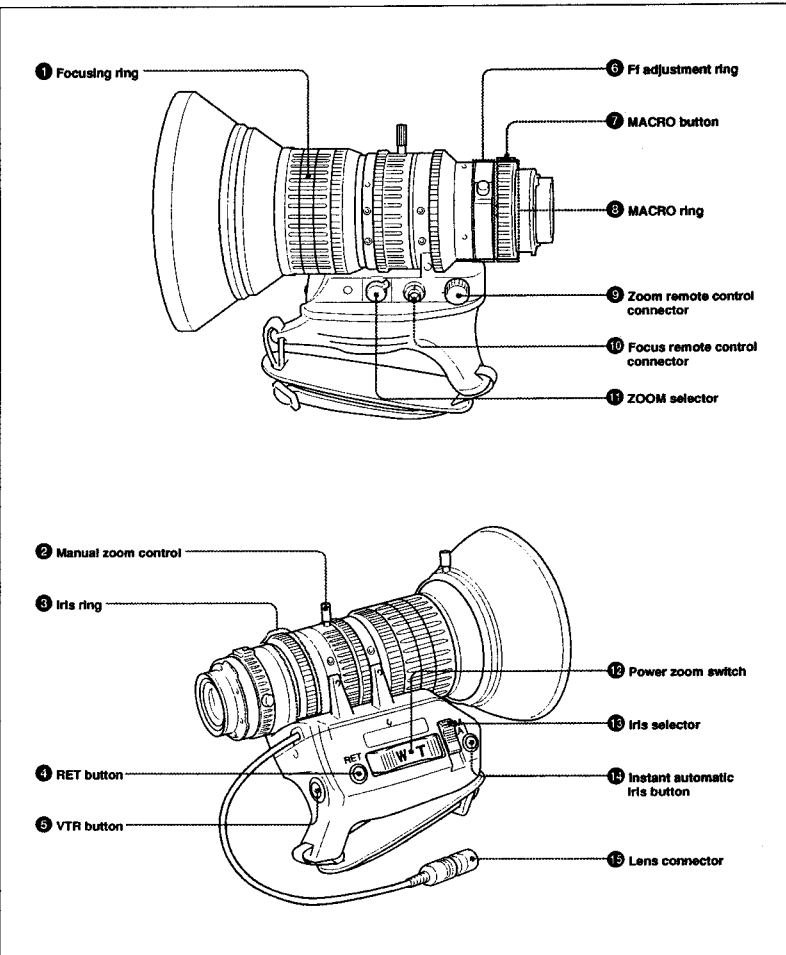
**⑧ REMOTE connector (10-pin)**  
You can connect an optional RM-M7G Remote Control Unit to this connector. When using the RM-M7G, set the CAMERA SELECT switch on its bottom to 1.

**⑨ LENS connector (12-pin, for 2/3-inch lens)**  
Connect the lens connector.

**⑩ VIDEO OUT connector (BNC)**  
This outputs the video signal captured by the camera.

## Location and Function of Parts

### VCL-916BYA Zoom Lens



### ① Focusing ring

Turn this ring to focus the lens on the subject.

### ② Manual zoom control

For direct manual zoom control, set the ZOOM selector to the "M" position, and turn this control.

### ③ Iris ring

For manual iris control, set the iris selector to the "M" position, and turn this control.

### ④ RET (return) button

This allows you to check the video signal as follows.

**When operating with a portable VTR connected:**  
when the VTR is recording, pressing this button connects the E-E video signal<sup>1)</sup> from the VTR to the viewfinder.

**When operating with a CCU-M3/M3P/M5/M5P/M7/M7P Camera Control Unit connected:**  
pressing this button connects the return video signal from the camera control unit to the viewfinder. When this button is not pressed, the viewfinder displays the video signal captured by the camera.

### ⑤ VTR button

**When operating with a portable VTR connected:**  
this button starts and stops recording on the VTR. Press it once to start recording, and once more to stop.

**When operating with a CCU-M3/M3P/M5/M5P/M7/M7P Camera Control Unit connected:**  
pressing this button connects the return video signal from the camera control unit to the viewfinder. (Starting and stopping recording is controlled on the VTR.)

### ⑥ Ff (flange focal length) adjustment ring

To adjust the flange focal length, loosen the screw on this ring, then turn the ring. (See page 50.)

### ⑦ MACRO button

For close-up work, hold this button down while turning the MACRO ring. (See page 52.)

### ⑧ MACRO ring

For close-up work, hold the MACRO button down while turning this ring. (See page 52.)

### ⑨ Zoom remote control connector (8-pin)

For remote control of zoom operations, connect an optional LO-23 Lens Remote Control Unit.

### ⑩ Focus remote control connector (3-pin)

This is not used.

### ⑪ ZOOM selector

This selects the mode of zoom operation.

**S (servo):** power zoom  
**M (manual):** manual zoom

### ⑫ Power zoom switch

Use this to carry out a power zoom.

**W end:** zoom toward wide angle  
**T end:** zoom toward telephoto  
Pressing the switch harder increases the zoom speed.

### ⑬ Iris selector

This selects the mode of iris operation. (See page 51.)

**A (automatic):** automatic iris  
**M (manual):** manual iris

### ⑭ Instant automatic Iris button

While using manual iris control, press this button to switch temporarily to the automatic iris control setting. The automatic setting is maintained as long as you hold the button down.

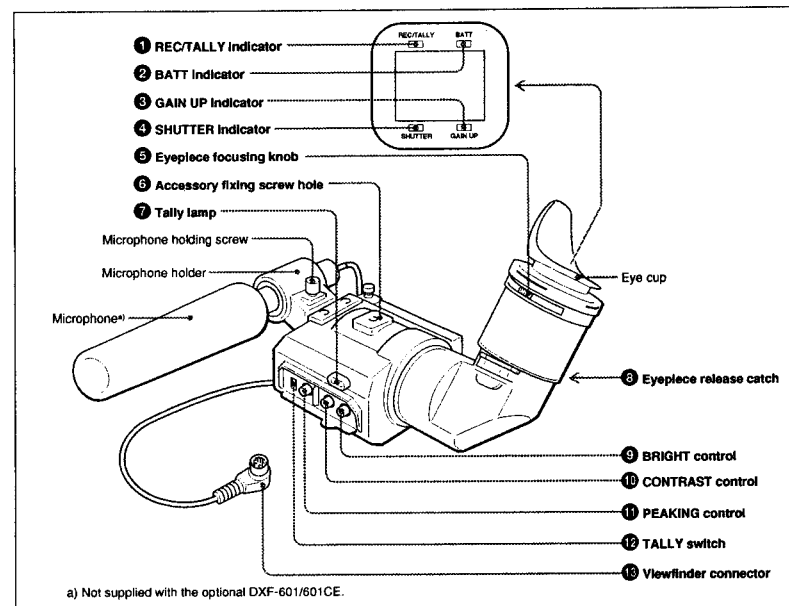
### ⑮ Lens connector

Connect this to the LENS connector on the camera head.

1) **E-E video signal:** "electric-to-electric" video signal. This is an output from the VTR of the input video signal which has passed through internal electrical circuits, but has not been converted to a magnetic signal in the heads or on the tape.

## Location and Function of Parts

### DXF-601/601CE Viewfinder



### ① REC/TALLY (recording/tally) Indicator (red)

- From the time when you press the VTR button on the lens or camera head, this flashes until recording starts, then stays on continuously during recording.
- When using a camera control unit, this lights when the video from this camera is selected.
- This is also used to indicate a fault. (See page 54.)

### ② BATT (battery) Indicator (red)

This indicates when the battery capacity is low. (See page 29.)

### Note

When using a camera control unit, this indicator flashes when you operate the controls, but this is not a malfunction.

### ③ GAIN UP Indicator (orange)

This lights when the gain is 3 dB or more.

### ④ SHUTTER Indicator (red)

This lights when the SHUTTER switch is in the ON position.

### ⑤ Eyepiece focusing knob

Turn this to adjust the viewfinder focus to m: eyesight. (See page 49.)

### ⑥ Accessory fixing screw hole

Attach optional video lights or other accessories here.

**7 Tally lamp**

When the TALLY switch is in the ON position, this operates in the same way as the REC/TALLY indicator.

**8 Eyepiece release catch**

To view the viewfinder screen directly, press this catch, and hinge up the eyepiece.

**9 BRIGHT (brightness) control**

This adjusts the brightness of the viewfinder image. (See page 49.)

**10 CONTRAST control**

This adjusts the contrast of the viewfinder image. (See page 49.)

**11 PEAKING control**

This adjusts the outline intensity of the viewfinder image.

**12 TALLY switch**

Set this switch to the ON position to use the tally lamp.

**13 Viewfinder connector**

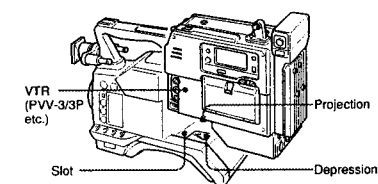
Connect this to the VF connector on the camera head.

## Attaching Other System Components

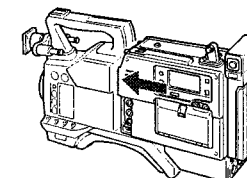
### Fitting a VTR

Use the following procedure to fit a VTR to the unit.

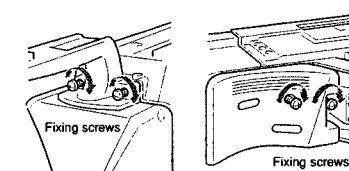
- 1** Insert the projection on the bottom of the VTR in the corresponding depression in the camera head.



- 2** Slide the VTR along the slot, so that it fits firmly into place.



- 3** Fasten the two fixing screws on the connection and the two on the shoulder pad.

**To remove the VTR**

Reverse the fitting procedure.

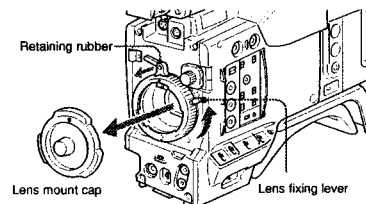
**To fit a camera adaptor**

Follow the same procedure as when fitting a VTR.

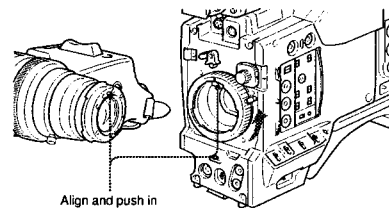
## Fitting the Lens

In the case of the DXC-637K/637PK model, the lens is already fitted. In other cases, use the following procedure to fit the lens.

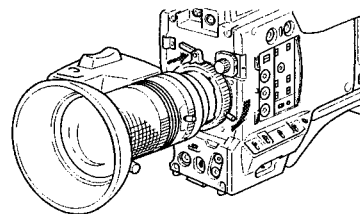
- 1 Remove the retaining rubber which prevents the lens mount from coming loose, then raise the lens fixing lever, and remove the lens mount cap.



- 2 With the lens fixing lever turned fully counterclockwise, push in the lens, aligning the projection on the lens with the cutout on the camera.



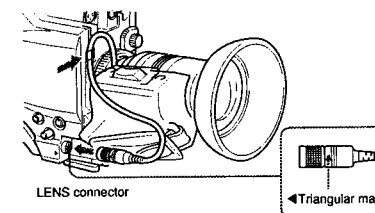
- 3 Supporting the lens, turn the lens fixing lever fully clockwise. Replace the retaining rubber on the lens mount.



(Continued)

## Attaching Other System Components

- 4 Using the triangular mark as a guide, push the lens connector into the LENS connector on the camera head, until it clicks into place. Fasten the cable with the clamps.

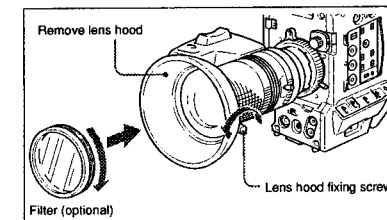


### If using a lens with a 6-pin connector

This camera head has a 12-pin LENS connector. If the lens cable has a 6-pin connector, fit an adaptor cable: LO-612 (manufactured by Canon) or ECF-124 (manufactured by Fujinon) or equivalent.

### Fitting optional filters

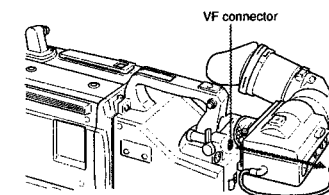
Loosen the lens hood fixing screw to remove the lens hood, then attach the filter.



## Removing the Viewfinder

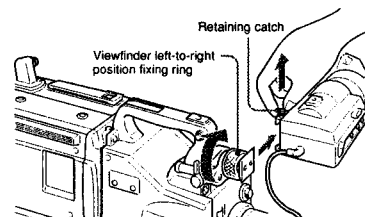
Remove any microphone from the viewfinder before beginning.

- 1 Pull the viewfinder connector out of the VF connector on the camera head.





- 2 Loosen the viewfinder left-to-right position fixing ring, then pulling up the retaining catch, slide the viewfinder out.

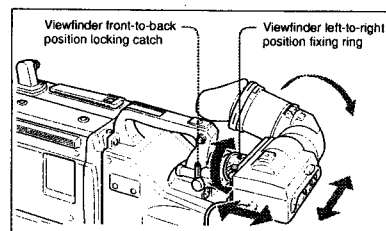


#### To fit the viewfinder

Reverse the removal procedure.

#### Adjusting the viewfinder position

To adjust the viewfinder left-to-right position, loosen the left-to-right fixing ring, and to adjust the front-to-back position loosen the front-to-back position locking catch.



#### Left eye adaptor

By fitting a left eye adaptor, you can use the camera with your left eye to the viewfinder.

#### Note

You cannot stow the camera attached with a left eye adaptor in the LC-421 Carrying Case.

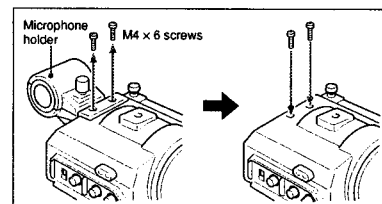
For details consult your Sony service representative.

#### Fitting an Optional Microphone

To use a long microphone such as the optional ECM-670/672, remove the supplied microphone holder, and fit an optional CAC-12 Microphone Holder to the camera, then mount the microphone in this holder.

#### Removing the supplied microphone holder

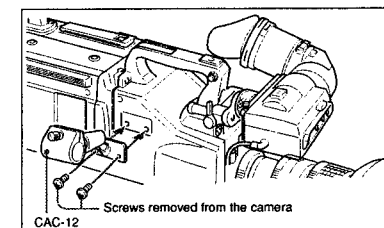
Remove the two microphone holder retaining screws (M4 × 6) from the viewfinder, remove the microphone holder, then replace the screws in their original positions.



#### Attaching Other System Components

#### Fitting the optional CAC-12 Microphone Holder

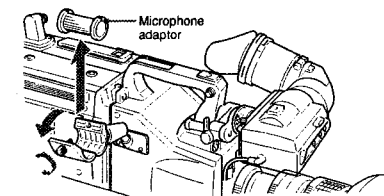
Remove the two retaining screws (M3 × 8) for the optional microphone holder, then use these screws to attach the CAC-12 Microphone Holder.



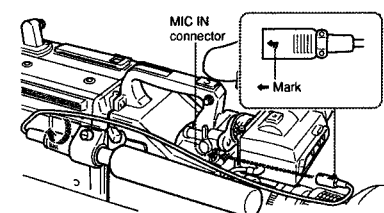
#### Fitting an optional microphone

Use the following procedure to attach an optional ECM-670 Microphone.

- 1 Loosen the screw of the CAC-12 Microphone Holder, then open the holder and replace the microphone adaptor with the one supplied with the ECM-670 Microphone.



- 2 Insert the microphone in the microphone holder, close the holder, and tighten the screw. Connect the microphone cable to the MIC IN connector.



#### Fitting optional microphones (operable with a 48 V supply) other than the ECM-670

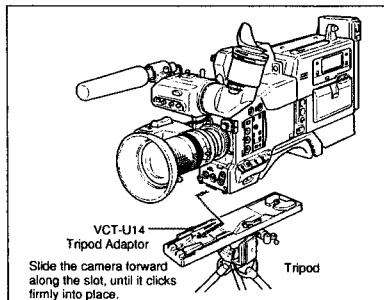
Use the same fitting procedure as for the ECM-670, but note the following differences with respect to the microphone adaptor.

ECM-672: no microphone adaptor required.

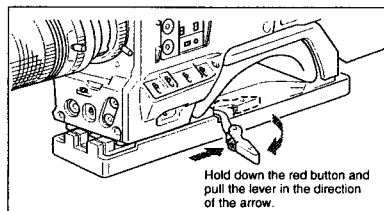
Slender microphones (19 mm (3/4 inch) diameter): use the microphone adaptor supplied with the CAC-12.

## Fitting a Tripod

First fit the VCT-U14 Tripod Adaptor to the tripod, then mount the camera on the tripod adaptor.

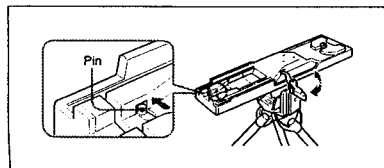


## Removal



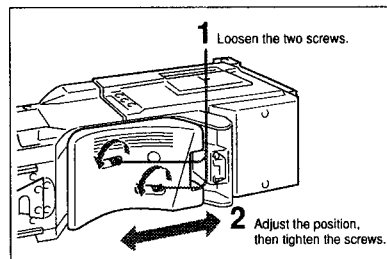
### Note

After removing the camera, if the tripod adaptor pin has not returned to its original position, hold down the red button and move the lever in the direction of the arrow to return the pin to its original position. It is not possible to mount a camera with the pin left out.



## Adjusting the Shoulder Pad Position

You can slide the shoulder pad toward the front or back by up to 10 mm from its central position (as when shipped). Adjust it to get the best balance when using the camera on your shoulder.



## Optional CAC-4 Chest Pad

When using the camera on your shoulder, attaching the optional CAC-4 Chest Pad reduces the load on your right hand supporting the zoom lens, and makes operation easier.

For details see the instructions provided with the CAC-4.

## Attaching Other System Components

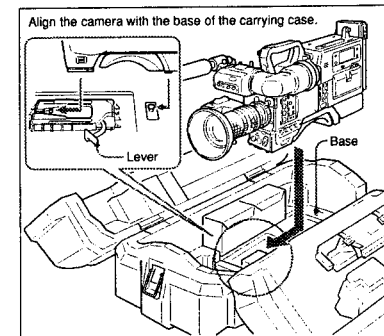
## Using the Optional Carrying Case

### Stowing the camera

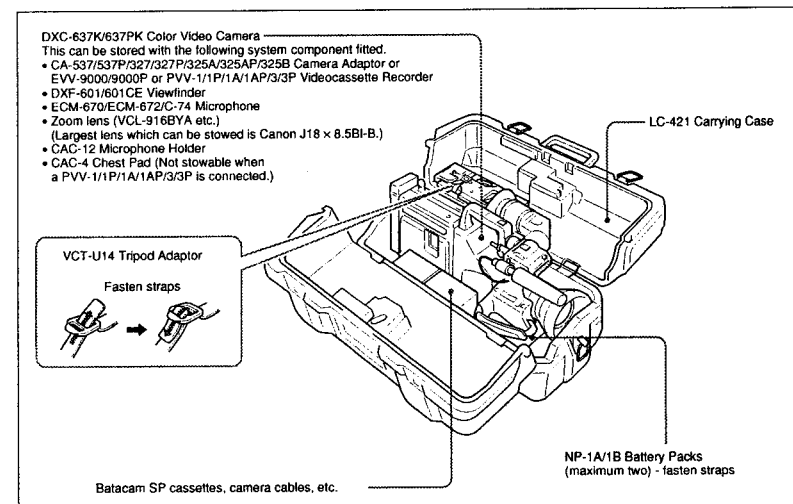
Align the camera with the base of the case, and slide the camera in forward. Checking that the pin at the rear engages correctly, push forward until it locks into place.

### Note

- Bring the viewfinder into the horizontal position, slide it fully rearward and to the left, then fix before stowing.
- When an optional microphone (ECM-670/672, C-74, etc.) is attached, loosen the microphone fixing screws, move the microphone to the lowest position, and fix before stowing.



### Example of fully-stowed carrying case

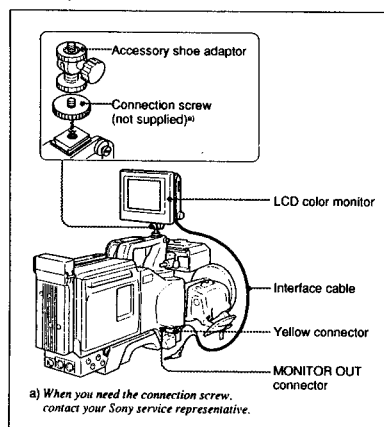




## Connections

### Connecting an Optional LCD Color Monitor

You can attach an optional LCD color monitor to the accessory shoe of the camera head.



Both the camera video and the character information as displayed on the viewfinder screen are output from the MONITOR OUT connector to the LCD monitor. The zebra pattern and markers are not output to the LCD monitor.

For details of the LCD monitor, see the instructions provided with it.

### Connecting a Portable VTR

Using the optional CA-537/537P or CA-327/327P Camera Adaptor and a camera cable, you can connect a portable VTR. Set the VTR selector switch on the camera adaptor according to the VTR connected.

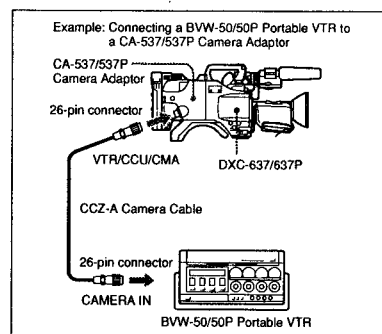
If using a VTR from another manufacturer, consult your sales representative or supplier.

### Checks before making connections

Check first that the video camera, camera adaptor, VTR, and other devices are all powered off.

### Making connections

Using a camera cable, connect the VTR/CCU/CMA connector on the camera adaptor to the camera input connector of the VTR.



#### Camera cable

- Select a camera cable to fit the camera input connector on the VTR you are using.
- The maximum camera cable extent is 10 m (33 ft).

For details, consult your sales representative or supplier.

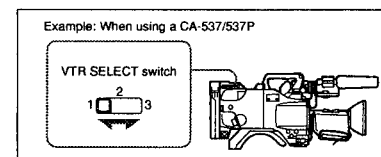
#### Video monitor

- If using an S-VHS VTR, using a video monitor with an S-video input connector and connecting it to the S-video connector of the VTR will allow you to monitor a clear picture, with no flecking.
- The output video signal from the VIDEO OUT connector of this unit is a composite video signal. Connect the VIDEO OUT connector of this unit to a composite video signal input connector of the monitor.

## Connections

### Setting the VTR selector switch on the camera adaptor

When using the camera with a CA-537/537P/327/327P Camera Adaptor, it is essential to correctly set the VTR selector switch on the camera adaptor according to the VTR connected. This switch determines the type of video signal output from the VTR/CCU/CMA connector and the audio output signal level.



VTR selector settings on the CA-537/537P

Connected VTR	VTR selector switch setting	Video output signal	Audio output signal level
Sony broadcast and professional VTRs: BVU-150/150P, VO-6800/6800PS <sup>a)</sup> , BVW-50/50P and BVV-5/5PS <sup>b)</sup>	1	Composite (BVU-150/150P and VO-6800/6800PS) or component (BVW-50/50P and BVV-5/5PS)	-60 dB
Sony professional VTRs: VO-8800/8800P and EVV-9000/9000P	3	Y/C	-60 dB
Panasonic AG-6400 VHS VTR	2	Composite	-20 dB
Panasonic AG-7400 S-VHS VTR <sup>a)</sup> and JVC BR-S405 S-VHS VTR	3	Y/C	-20 dB

- a) Set the audio input level on the VO-6800/6800PS to -60 dB.  
b) When the BVV-5/5PS is used as a portable VTR, a VA-5/5P VTR Composite/Component Adaptor is required.  
c) Set the input selector switch on the AG-7400 to Y/C.

VTR selector settings on the CA-327/327P

Connected VTR	VTR selector switch setting	Video output signal	Audio output signal level
Sony broadcast and professional VTRs: BVU-150/150P and VO-6800/6800PS <sup>a)</sup>	1	Composite	-60 dB
Sony professional VTRs: VO-8800/8800P and EVV-9000/9000P	2	Y/C	-60 dB
Panasonic AG-6400 VHS VTR	3	Composite	-20 dB
Panasonic AG-7400 S-VHS VTR <sup>a)</sup>	4	Y/C	-20 dB

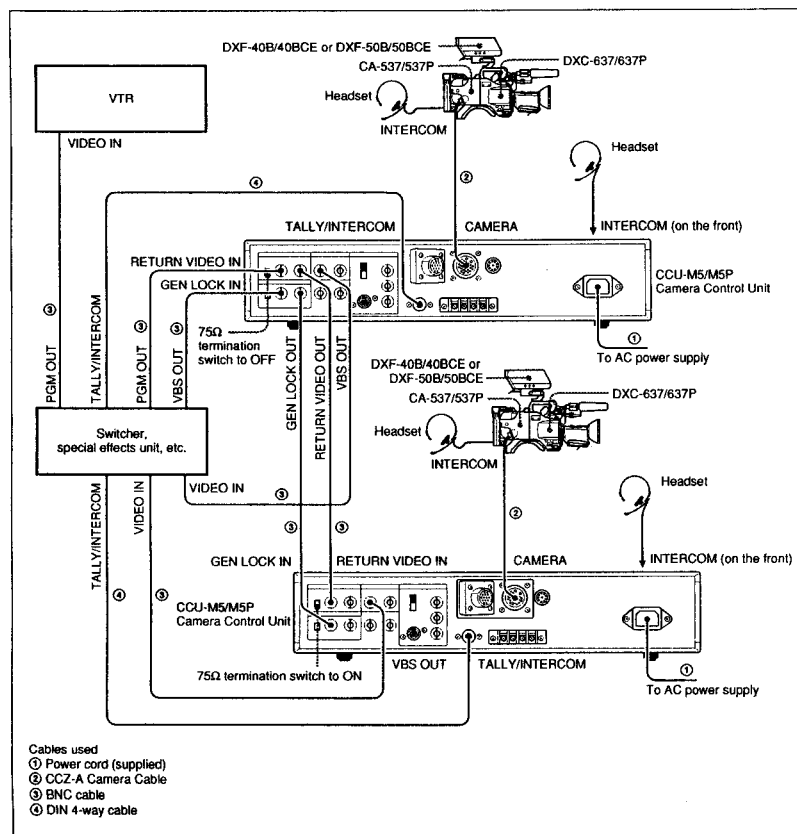
- a) Set the audio input level on the VO-6800/6800PS to -60 dB.  
b) Set the input selector switch on the AG-7400 to Y/C.

## Connecting a Number of Cameras (Using a Camera Control Unit)

When using a number of cameras in the studio, it may be necessary to use a CCU-M5/M5P/M7/M7P Camera Control Unit to provide video and color sync between cameras, and special effects and other devices to allow switching, wipes and so forth.

In the studio it may also be convenient to use a DXF-40B/40BCE/50B/50BCE Viewfinder. The figure below shows an example studio configuration.

For details, consult your sales representative or supplier.



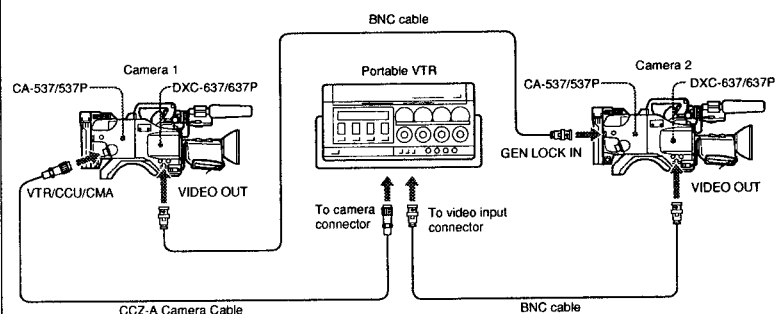
## Connections

### Connecting a Number of Cameras (Without Using a Camera Control Unit)

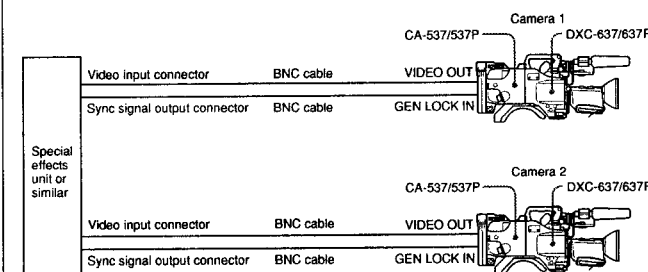
When using two or more synchronized cameras without a camera control unit, connect an external sync signal to the GEN LOCK IN connector on the camera adaptor (CA-537/537P etc.), supplying a VBS or BS

signal. The camera will then operate synchronized to this signal. You can adjust the synchronization using the basic menus. (See page 38.)

Example 1: Camera 2 synchronized to the signal from camera 1



Example 2: Cameras 1 and 2 synchronized to the signal from a special effects unit or similar







## Power Supply

This unit operates on either a battery pack or an AC supply (using the optional CMA-8A/8ACE Camera Adaptor).

*For details of the power supplies which can be used, refer to the documentation supplied with the VTR connected to this unit or the camera adaptor.*

### Using an Anton Bauer Intelligent Battery System and Ultralight System

Fitting the special battery mount made by Anton Bauer Corporation to this unit allows you to use their Intelligent Battery System and Ultralight System.

*For details, consult your Anton Bauer products supplier or Sony service representative.*

### Using Battery Packs

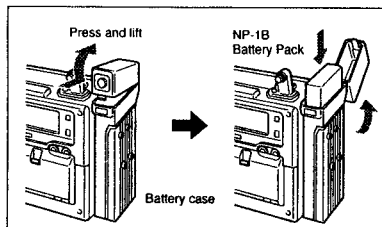
Always fully charge a battery pack before using it.

#### Notes

- Be careful that other metal objects do not come in contact with the metal parts of the battery pack, as this could cause a short.
- Do not leave the battery pack in the camera if it is not going to be used for a long time.
- If the battery pack is recharged after use while still hot, it may not be possible to obtain a full charge.

### Fitting a battery pack (NP-1B)

Open the lid of the battery case, insert a fully-charged battery pack, and close the lid.



### Battery pack operating times

The following table shows approximate continuous operating times, when operating the camera and 1.5-inch viewfinder at normal temperatures, with a camera adaptor and an EVV-9000/9000P or PVV-3/3P connected.

Approximate operating times with a fully-charged battery pack

Battery pack	With camera adaptor	With EVV-9000/9000P	With PVV-3/3P
NP-1B	110 minutes	75 minutes	60 minutes
NP-1A	85 minutes	55 minutes	50 minutes
BP-90A <sup>a)</sup>	—	150 minutes	140 minutes

a) Requires the special-purpose DC-500 Battery Case. Cannot be used with a camera adaptor.

### Battery low indications

When the voltage of the supply to the camera lowers to or below 11.0 V, the battery voltage indication appears in the viewfinder, and the BATT indicator in the viewfinder flashes.

If you continue using the camera, the BATT indicator stops flashing, and remains on continuously.

When the battery pack is low, replace it with a fully-charged battery pack.

### Battery pack charging

Before using a battery pack, charge it as shown in the following table.

*For details of battery charger operation, refer to the instructions provided with the battery charger to be used.*

Battery pack charging

Battery pack	Battery charger	Approximate charging time (normal temperature)
NP-1A	BC-1WA, BC-1WB, BC-410	70 minutes
NP-1B	BC-1WB, BC-410	95 minutes
BP-90A	BC-410	160 minutes

## Power Supply

### Camera Adaptor Power Supply

The camera adaptor automatically operates on power supplied to the VTR/CCU/CMA connector from the portable VTR, CCU-M7/M7P Camera Control Unit, CMA-8A/8ACE Camera Adaptor or other connected device.

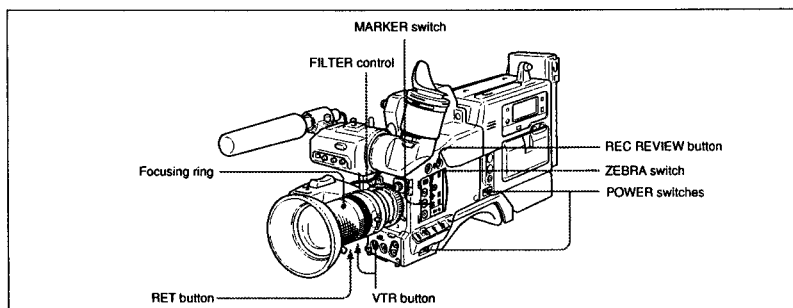
#### Note

Before use, check that the device connected to the VTR/CCU/CMA connector is able to provide the power required by the camera.

If it is not able to provide the necessary power, or when it is necessary to prolong the operating time, use the camera with a separate power supply.

## Shooting

### Basic Procedure for Shooting



- 1 Connect the camera head to the VTR or camera adaptor, and power them on.
- 2 Set the FILTER control appropriately for the lighting conditions.
 

Filter setting	Lighting conditions
1 (3200K)	Studio halogen lighting (incandescent), sunrise and sunset.
2 (CROSS)	Four-point starburst filter for special effects at weddings and so forth.
3 (5600K)	Cloudy or rainy outdoor shooting, and fluorescent lighting.
4 (5600K + 1/16ND)	Sunlight. This setting includes a 1/16 neutral density filter (reducing the exposure by the equivalent of four stops). Use it to prevent hunting <sup>1)</sup> or to reduce the depth of field <sup>2)</sup> .
- 3 Check the switch settings on the camera head. (See pages 9 to 13.)  
If there is not sufficient time to check the camera settings, you can use "easy mode" by setting the EZ MODE switch to the ON position. The camera is automatically adjusted to standard settings, and the iris and the white balance are adjusted automatically. (See page 41.)
- 4 Check the settings in the basic menus (page 37) and advanced menus (page 40).
- 5 Check the lens settings (pages 14 and 15) and flange focal length adjustment (page 50).
- 6 Adjust the eyepiece focus, and the contrast and brightness of the viewfinder image (page 49).
- 7 Check the sound system settings.
  - Camera microphone connections
  - Settings on the VTR (refer to the VTR instructions)
- 8 If required, switch on the center marker and/or safety zone (MARKER switch) and zebra pattern (ZEBRA switch) in the viewfinder image.
- 9 Adjust the white balance (page 43) and black balance (page 46).
- 10 Turn the focusing ring so that the subject is sharply in focus. It may be convenient to use the EZ FOCUS button for the "easy focus" function (see page 9).

(continued)

1) **Hunting:** This occurs if the automatic iris function is not able to reach a stable state, and as a result the image brightness keeps changing, alternately lighter and darker.

2) **Depth of field:** This is the range over which the subject is sharply in focus.

## Shooting

- 11 Press the VTR button on the lens or camera body to start recording.
  - During recording, the REC/TALLY indicator in the viewfinder lights, and "REC" appears on the viewfinder screen.
  - Depending on the setting of the REC TIME switch (see page 10), you can display the total recording time or the length of the current cut on the viewfinder screen.

- 12 To pause recording, press the VTR button again.

### Monitoring the recorded image

During recording it is normally the camera image that appears in the viewfinder. By holding the RET button down, however, it is possible to monitor the return video signal (from a camera control unit) or E-E video signal from a portable VTR.

#### Note

This function may not be provided by some VTRs. Refer to the instructions for the VTR.

### Reviewing the recording

It is possible to review the last few seconds of the recording on the tape. Press the VTR button to pause recording, then press the camera REC REVIEW button. This automatically rewinds a few seconds from the paused position, then plays back this section in the viewfinder. The VTR then returns to the paused state.

#### Note

This function may not be provided by some VTRs. Refer to the instructions for the VTR.



## Viewfinder Screen Indications and Menus

### Viewfinder Screen Indications

There are three types of indication screen which appear in the viewfinder, as follows.

#### • Normal indications

These show the operating state of the camera and connected VTR. (See page 35.)

#### Status indications

Pressing the DISP CHG switch up while the normal indications are present adds a display of five more settings. (See page 37.)

#### • Basic menus

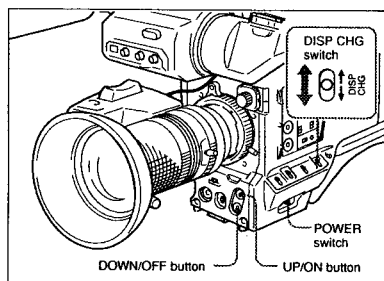
These provide settings for the lens iris, shutter speed and so forth, and also a titling screen. (See the section "Viewfinder Basic Menus" page 37.)

#### • Advanced menus

These provide settings for the center marker, zebra pattern, viewfinder screen indications, and so forth. (See the section "Viewfinder Advanced Menus" page 40.)

### Changing the viewfinder display

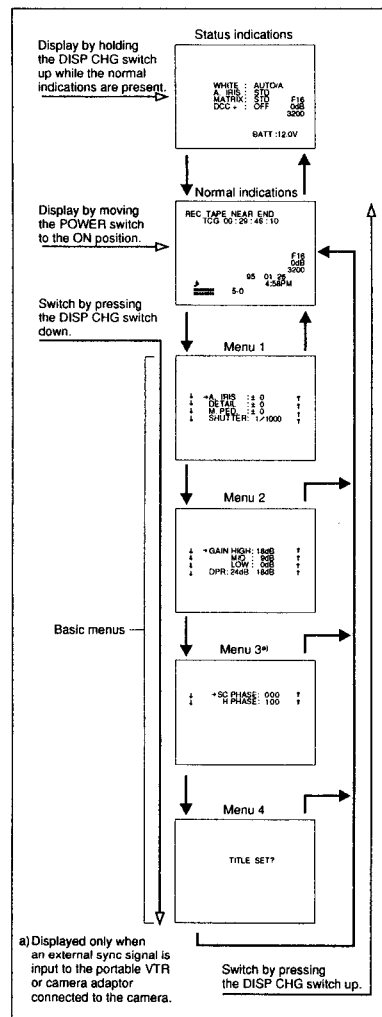
Use the buttons and switches shown in the following figure to switch the viewfinder display among the normal indications, basic menus and advanced menus.



#### Displaying the normal indications and switching to the basic menus

To display the normal indications, move the POWER switch to the ON position.

To switch to and from the basic menus, use the DISP CHG switch.



## Viewfinder Screen Indications and Menus

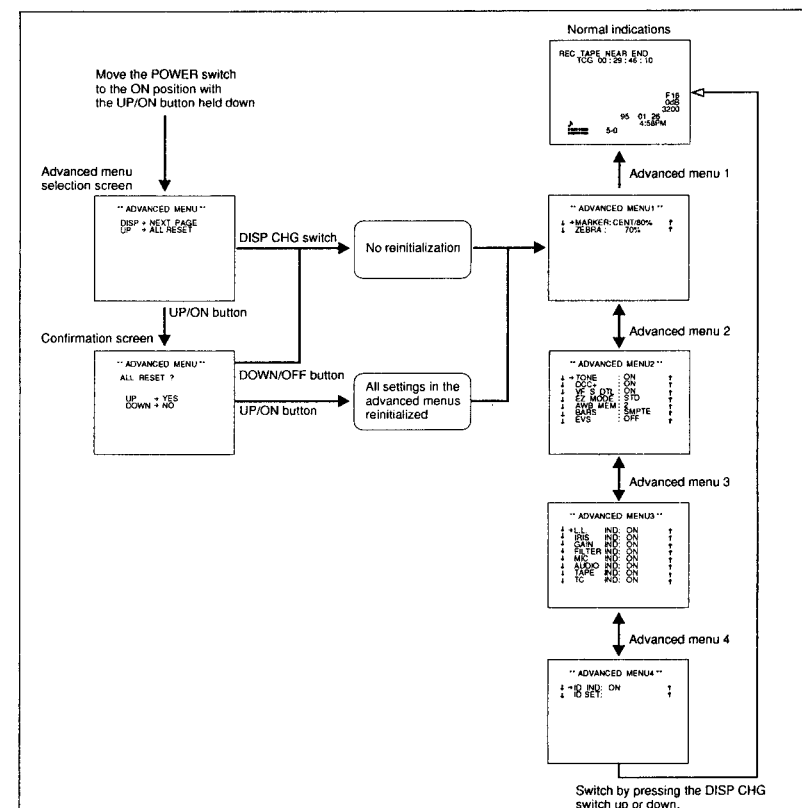
### Displaying the advanced menus and switching to the normal indications

Use the following procedure to display the advanced menus.

- ① Move the POWER switch to the ON position while holding down the UP/ON button to display the advanced menu selection screen.
- ② To display the first advanced menu immediately, press the DISP CHG switch up or down.

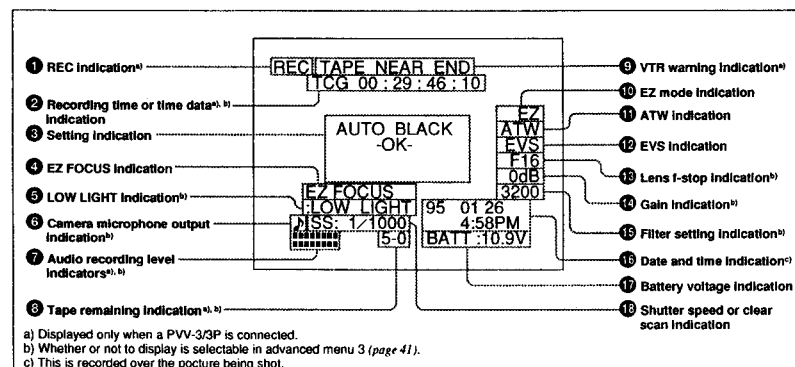
- To reinitialize all settings in the advanced menus to their factory defaults, press the UP/ON button. A confirmation screen appears. Press the UP/ON button to confirm the reinitialization, or the DOWN/OFF button to cancel it. In either case, the display now switches to advanced menu 1.

To switch to the normal indications, use the DISP CHG switch.



## Viewfinder Normal Indications

During normal operation, the following items can be indicated in the viewfinder.



The significance of each of the indications shown in the figure is as follows.

### 1 REC Indication

This appears when the VTR is recording.

### 2 Recording time or time data indication

This shows the following values:

- When the REC TIME switch on the camera is in the TTL position  
The total recording time
- When the REC TIME switch on the camera is in the DUR position  
The duration of the current recording cut
- With a PVV-3/3P connected, when the REC TIME switch on the camera is in the OFF/TC position and the advanced menu item TC IND is set to "ON"  
A time data value from the PVV-3/3P depending on the DISPLAY switch settings on the PVV-3/3P as shown in the following table.

Time data indications

PVV-3/3P DISPLAY switch setting	Time data displayed
CTL	CTL: a time code obtained by counting pulses on the CTL signal
TC	TCG: a time code from the time code generator
U-BIT	UBG: a user bit value from the user bit generator

#### Note

No time data values appear during black balance and white balance adjustment, and when the VTR is in playback, fast forward, rewind, or recording review modes.

### 3 Setting Indication

For the controls listed below, after a setting or adjustment operation, a message appears showing the new setting, or the state or result of the adjustment. The message remains for approximately two seconds.  
GAIN switch, OUTPUT/DCC switch, WHITE BAL switch, AUTO IRIS (BACK L) button, AUTO IRIS (SPOT L) button, MATRIX switch, MIC LOW CUT switch, WHT/BLK switch, and EZ FOCUS button

## Viewfinder Screen Indications and Menus

### 4 EZ FOCUS indication

This appears when the EZ FOCUS button is pressed, enabling the "easy focus" function.

### 5 LOW LIGHT indication

This warning appears if the lighting level is inadequate.

### 6 Camera microphone output indication

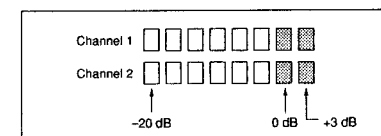
This appears when there is an input from the camera microphone.

#### Note

This indication serves as a check on whether the camera microphone is operating correctly, but it does not provide confirmation that the VTR is recording sound. Check that the audio recording levels on the VTR are set correctly.

### 7 Audio recording level indicators

These show the recording levels of audio channels 1 and 2 on the VTR.



### 8 Tape remaining indication

This shows the tape remaining in the VTR as follows.

Tape remaining indications

Indication	Tape remaining
F-30	At least 30 minutes
30-25	25 - 30 minutes
25-20	20 - 25 minutes
20-15	15 - 20 minutes
15-10	10 - 15 minutes
10-5	5 - 10 minutes
5-0	2 - 5 minutes
5-0 (flashing)	0 - 2 minutes

### 9 VTR warning indication

VTR warning indications

Indication	Meaning
NO TAPE	There is no tape loaded.
REC INHIBIT	The tape is in the recording inhibited state.
LOW BATT.	The battery is almost exhausted.
BATT. END	The battery is exhausted.
TAPE NEAR END	The tape is near the end.
TAPE END	The tape is at the end.
CHECK REMOTE	A device other than a remote control unit (e.g. headphones) is connected to the REMOTE connector.
SERVO	The servo lock has been lost.
HUMID	There is condensation.
RF	The video heads are clogged, or there is some other fault in the recording system.
SLACK	The tape is not wound properly.
OXIDE TAPE	An oxide tape has been loaded. (The tape is automatically ejected.)

### 10 EZ mode indication

This appears when the EZ MODE switch is in the ON position.

In the "easy mode", the auto tracing white balance function operates, so the ATW indication also appears at the same time.

### 11 ATW indication

This appears when the ATW button is pressed, turning the indicator on. It indicates that the auto tracing white balance function is operating.

### 12 EVS indication

This appears when the EVS (Enhanced Vertical definition System) function is enabled. (See page 41.)

### 13 Lens f-stop indication

This shows the f-stop of the lens.

#### Note

Depending on the lens being used, this indication may differ slightly from the actual f-stop on the lens.



### 14 Gain indication

This shows the gain value, and the settings of the HYPER GAIN switch and the DPR (Dual Pixel Readout) function (see page 38) as shown in the following table.

Gain indications

Example indication	Meaning
18dB	Gain setting is 18 dB.
DPR 18dB	The DPR function is enabled. In this case the DPR function approximately doubles the gain (an increase of 6 dB) over the current gain setting (in this case 18 dB).
HYPER	The HYPER GAIN switch is in the ON position. In this case the hyper gain function increases the gain by a factor of about 60 with respect to 0 dB regardless of the current gain setting (that is, increased to 36 dB).

### 15 Filter setting indication

This shows the setting of the FILTER control.

Filter setting indications

Indication	Filter setting
3200	1 (3200K)
CROSS	2 (CROSS)
5600	3 (5600K)
56ND	4 (5600K + 1/16ND)

### 16 Date and time indication

This appears in the following cases, depending on the CLOCK switch setting (ON, BARS, OFF).

ON: When either the camera video or the color bars are displayed.

BARS: When the color bars are displayed.

OFF: (The date and time indication does not appear.)

When this indication appears, it is recorded over the picture being shot.

### 17 Battery voltage indication

When the voltage of the supply to the camera is 11.0 V or below, it is shown here. However, when the DISP CHG switch is pressed up, the battery voltage appears even when it is more than 11.0 V.

### When a PVV-3/3P is connected and an Anton Bauer Intelligent Battery System is used

The remaining battery capacity is shown as a percentage.

### 18 Shutter speed or clear scan indication

When the SHUTTER switch is in the ON position, the shutter speed or clear scan setting (see page 47) appears here.

### Status indications

Pressing the DISP CHG switch up while the normal indications are present adds a display of the following switch settings for as long as the switch is held.

- White balance adjustment method selection (ATW, PRESET, A or B) (See pages 43 to 45.)
- AUTO IRIS button settings (BACK L, SPOT L or STD (both BACK L and SPOT L off))
- MATRIX switch setting (H.SAT, FL or STD)
- DCC/DCC+ function setting (ON or OFF) (See page 40.)
- Battery voltage indication (Indicated even if the value is 11.0 V or over.)

### Example display

WHITE : AUTO/A	
A. IRIS : STD	F16
MATRIX : STD	0dB
DCC+ : OFF	3200
BATT :12.0V	

### Viewfinder Basic Menus

To display the basic menus, with the normal viewfinder indications displayed, press the DISP CHG switch down. There are four basic menus, which provide the following functions.

- Menus 1 to 3: settings
  - Menu 4: entering and saving a title
- Use the DISP CHG switch to move from one menu to the next.

## Viewfinder Screen Indications and Menus

### Changing settings (menus 1 to 3)

Use the DISP CHG switch to align the cursor with the item to be changed, then press the UP/ON or DOWN/OFF button to select the required value.

To reset the setting to its normal value (factory default), press the UP/ON button and DOWN/OFF button simultaneously.

The items and their settings are listed below.

### Basic menu 1

→A. IRIS : ± 0  
DETAIL : ± 0  
M. PED : ± 0  
SHUTTER : 1/1000

Items and settings in basic menu 1

Item	Settings
<b>A. IRIS</b> Reference value for automatic adjustment of lens iris	−1.0, −0.5, ±0 (normal value), +0.5, and +1.0 Negative adjustment values stop down the iris, and positive values open it up.
<b>DETAIL</b> Level of detail (outline) emphasis	−99 to ±0 (normal value) to +99 Negative adjustment values soften the picture outlines, and positive values sharpen it.
<b>M. PED</b> Master pedestal level	MIN, −30 to ±0 (normal value) to +30, MAX Negative adjustment values make dark parts of the picture darker and increase the contrast. Positive adjustment values make dark parts of the picture lighter and reduce the contrast.
<b>SHUTTER</b> Shutter speed or clear scan setting (See page 47.)	1/100 (NTSC) or 1/60 (PAL) (normal value), 1/250, 1/500, 1/1000, 1/2000, and 60.4 Hz to 200.3 Hz (NTSC) or 60.3 Hz to 201.4 Hz (PAL) Select the shutter speed or scan frequency setting for the clear scan function.

### Basic menu 2

→GAIN HIGH: 18dB  
MID : 9dB  
LOW : 0dB  
DPR: 24dB 18dB

Items and settings in basic menu 2

Item	Settings
<b>GAIN</b> Gain values corresponding to the three positions (H, M, L) of the GAIN switch.	−3, 0, 3, 6, 9, 12, 18, 24 dB (normally 18, 9, 0 dB) Select the values so that HIGH > MID > LOW.
<b>DPR</b> DPR (Dual Pixel Readout) function setting.	<b>OFF:</b> DPR function is disabled. (Normal setting) <b>24dB:</b> DPR function is enabled when gain is 24 dB. Value of gain obtained is thus 30 dB (24 dB + 6 dB). <b>24dB 18dB:</b> DPR function is enabled when gain is 24 dB or 18 dB. Value of gain obtained is thus 30 dB (24 dB + 6 dB) or 24 dB (18 dB + 6 dB).
<b>Note</b>	Increasing the gain with the DPR function reduces the horizontal resolution by about 50%.

### Basic menu 3

This menu is displayed only when an external sync signal is input to the portable VTR or camera adaptor connected to the camera.

→SC PHASE: 000  
H PHASE: 100

Items and settings in basic menu 3

Item	Settings
<b>SC PHASE</b> Subcarrier phase adjustment <sup>a)</sup>	000 (normal value) to 999
<b>H PHASE</b> Horizontal phase adjustment <sup>a)</sup>	000 to 100 (normal value) to 199

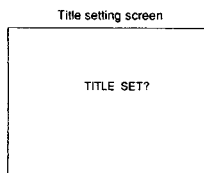
a) These adjustments are for use when the camera is genlocked to an external sync signal for operation together with other cameras. (See page 28.)

**Entering and saving a title (menu 4)**

You can create a title of up to four lines, each of twelve alphanumeric or punctuation characters, and then save it. It is then possible to record the title over the picture while shooting.

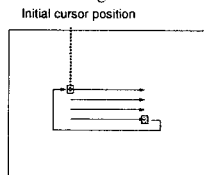
**Entering the title**

- 1 Press the DISP CHG switch as necessary to display the title setting screen in the viewfinder.



If a title is already present, it appears on this screen. To delete the displayed title, press the UP/ON and DOWN/OFF buttons simultaneously.

- 2 Press the UP/ON button. This brings up the cursor on the screen, and switches to title editing mode.



- 3 Press the DOWN/OFF button to move the cursor to the position where you wish to insert a character.

**To move the cursor back**

With the DOWN/OFF button held down, press the UP/ON button.

- 4 Press the UP/ON button to select the required character. Each time you press the UP/ON button, the character cycles through the following sequence.

→ ABCDEFGHIJKLMNOPQRSTUVWXYZ?;0123456789<>\_ . , - (space)

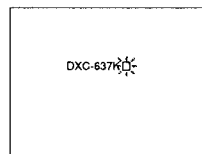
**To reverse the character sequence**

With the UP/ON button held down, press the DOWN/OFF button.

- 5 Press the DOWN/OFF button to confirm the character selection. The cursor advances to the next character position.

**To change a character after confirming it**  
Return to step 3, and input the character again.

- 6 Repeat steps 4 and 5 until the title is complete.



- 7 When the title is complete, press the DISP CHG switch as necessary to return to the normal viewfinder indications. The title created is retained, even when you power the camera off.

**To record a title**

- 1 Press the DISP CHG switch as necessary to display the title setting screen in the viewfinder.
- 2 Press the UP/ON button once.
- 3 Start shooting.
- 4 To stop the title recording, press the VTR button to pause the recording, then press the DISP CHG switch to clear the title screen.

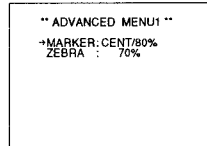
**Note on using the CCU-M5 M5P Camera Control Unit**

When the CCU-M5/M5P has a function switch setting of "TITLE ON", the title display takes precedence, and the setting indications (see page 35) do not appear in the normal viewfinder screen. However, when you press the DISP CHG switch up, for as long as you hold it up the status indications appear in place of the title.

**Viewfinder Screen Indications and Menus****Viewfinder Advanced Menus**

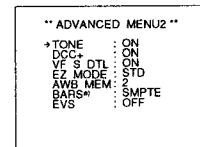
To display the advanced menus, move the POWER switch to the ON position while holding down the UP/ON button. (See page 34.) There are four advanced menus, and the DISP CHG switch is used for moving from one menu to the next and for item selection within each menu. Use the UP/ON button and DOWN/OFF button to change the setting of the currently selected item.

To reset the setting to its normal value (factory default), press the UP/ON button and DOWN/OFF button simultaneously. The settings in each of the advanced menus are listed below.

**Advanced menu 1**

Items and settings in advanced menu 1

Item	Settings
<b>MARKER</b> On/off setting of center marker and size (percentage of area of viewfinder screen) and on/off setting of safety zone marker. This setting is effective when the MARKER switch is in the ON position.	<b>CENT/90%:</b> display center marker and safety zone marker at 90% size. (Normal setting) <b>CENT/80%:</b> display center marker and safety zone marker at 80% size. <b>90%:</b> display safety zone marker only at 90% size. <b>80%:</b> display safety zone marker only at 80% size. <b>CENT:</b> display center marker only.
<b>ZEBRA</b> Reference level setting for the zebra pattern indication. The zebra pattern indication appears at this setting when the ZEBRA switch is in the ON position.	<b>70%:</b> display the zebra pattern over parts of the image at an IRE image level of 65% to 75%. (Normal setting) <b>100%:</b> display the zebra pattern over parts of the image at an IRE image level of 100% or more.

**Advanced menu 2**

a) Not displayed for PAL versions.

Items and settings in advanced menu 2

Item	Settings
<b>TONE</b> Whether or not to output a 1 kHz audio tone with the color bars when the OUTPUT/DCC switch is in the BARS/DCC OFF position.	<b>ON:</b> output. (Normal setting) <b>OFF:</b> do not output.
<b>DCC+</b> DCC+ function setting for eliminating white burn-out when shooting a very bright subject. This setting is effective when the OUTPUT/DCC switch is in the CAM/DCC ON position.	<b>ON:</b> enable the DCC+ function. (Normal setting) <b>OFF:</b> disable the DCC+ function.
<b>VF S DTL</b> Whether or not to add a V-DTL signal to the video signal for the viewfinder for easier focusing.	<b>ON:</b> add a V-DTL signal. (Normal setting) <b>OFF:</b> do not add a V-DTL signal.
<b>EZ MODE</b> Which settings of switches and menu items should be changed to standard values when the EZ MODE switch is in the ON position. <b>Note</b> You cannot use the "easy mode" function when a camera control unit or a remote control unit is connected to the camera.	<b>STD:</b> change to full set of standard values <sup>1)</sup> . (Normal setting) <b>CUSTOM:</b> change to only partial set of standard values <sup>1)</sup> .
<b>AWB MEM</b> Number of white balance adjustments saved in memory.	<b>2:</b> Two settings, A and B. The same values are used for all four of the FILTER control positions. <b>2X4FL:</b> Eight settings: separate values for each of the A and B memory selections and for the four FILTER control settings.
<b>BARS (for NTSC only)</b> Width selection for color bars.	<b>SMPTE:</b> normal width bars. (Normal setting) <b>SNG:</b> narrower bars. This setting is used in some cases for transmission via communications satellite.



## Viewfinder Screen Indications and Menus

Items and settings in advanced menu 2 (continued)

Item	Settings
<b>EVS</b> Whether or not to enable the EVS function to increase the vertical definition from 400 lines to 450 lines (NTSC) or from 450 lines to 530 lines (PAL).	<b>ON:</b> enable the EVS function. <b>OFF:</b> disable the EVS function. (Normal setting)
<b>Notes</b> <ul style="list-style-type: none"><li>When using a CCU-M5/MSP Camera Control Unit, make this setting on the CCU-M5/MSP.</li><li>Enabling this function tends to increase the occurrence of aliasing (moiré patterns).</li></ul>	

a) Standard settings when EZ MODE is set to "STD"

Item	Value
Iris adjustment mode	Automatic adjustment
White balance adjustment mode	ATW function (Auto Tracing White balance)
Camera image (CAM) or color bar (BARS) output	Camera image
High, medium and low gain settings*	0 dB, 9 dB, 18 dB
Dynamic contrast control function (DCC)	On
Date and time display	Off
Electronic shutter*	Off
Color matrix setting*	Standard
Hyper gain function	Off
Auto iris backlight mode	Off
Auto iris spotlight mode	Off
Black balance adjustment	Automatic adjustment enabled
Master pedestal level (M. PED)*	±0
Detail (outline) emphasis level*	±0
Iris automatic adjustment reference value	±0
Dual pixel readout (DPR) function*	Off

b) When EZ MODE is set to "CUSTOM", moving the EZ MODE switch to the ON position does not change the items marked with an asterisk in the above table to standard values.

### Advanced menu 3

** ADVANCED MENU3 **	
→ L.L. IND:	ON
IRIS IND:	ON
GAIN IND:	ON
FILTER IND:	ON
MIC IND:	ON
AUDIO IND:	ON
TAPE IND:	ON
TC IND:	ON

The items in advanced menu 3 select which items are normally displayed in the viewfinder.

Items and settings in advanced menu 3

Item	Settings
<b>L.L. IND</b> Whether or not to show the LOW LIGHT indication when the lighting is insufficient.	<b>ON:</b> show the LOW LIGHT indication. (Normal setting) <b>OFF:</b> do not show the LOW LIGHT indication.
<b>IRIS IND</b> Whether or not to show the lens f-stop indication. Regardless of this setting, however, the lens f-stop indication shows constantly when the EZ MODE switch is in the ON position.	<b>ON:</b> show the lens f-stop indication. (Normal setting) <b>OFF:</b> do not show the lens f-stop indication.
<b>GAIN IND</b> Whether or not to show the gain indication (the gain setting, and the settings of the HYPER GAIN switch and the DPR function) constantly. Regardless of this setting, however, the gain indication shows constantly when the EZ MODE switch is in the ON position.	<b>ON:</b> show the gain indication constantly. (Normal setting) <b>OFF:</b> show the gain indication only for about 2 seconds after the setting is changed.
<b>FILTER IND</b> Whether or not to show the setting of the FILTER control constantly. Regardless of this setting, however, the setting of the FILTER control indication shows constantly when the EZ MODE switch is in the ON position.	<b>ON:</b> show the setting of the FILTER control constantly. (Normal setting) <b>OFF:</b> show the setting of the FILTER control only for about 2 seconds after the setting is changed.
<b>MIC IND</b> Whether or not to show the camera microphone output indication.	<b>ON:</b> show the camera microphone output indication. (Normal setting) <b>OFF:</b> do not show the camera microphone output indication.

Items and settings in advanced menu 3 (continued)

Item	Settings
<b>AUDIO IND</b> When connected to a PVV-3/3P, whether or not to show the audio recording level indicators.	<b>ON:</b> show the audio recording level indicators. (Normal setting) <b>OFF:</b> do not show the audio recording level indicators.
<b>TAPE IND</b> When connected to a PVV-3/3P, whether or not to show the tape remaining indication.	<b>ON:</b> show the tape remaining indication. (Normal setting) <b>OFF:</b> do not show the tape remaining indication.
<b>TC IND</b> When connected to a PVV-3/3P, whether or not to show a time data value.	<b>ON:</b> show the time data value. (Normal setting) <b>OFF:</b> do not show the time data value.

### Advanced menu 4

** ADVANCED MENU4 **	
→ ID IND:	ON
ID SET:	↓

Items and settings in advanced menu 4

Item	Settings
<b>ID IND</b> Whether or not to show the camera ID in the viewfinder when color bars are displayed.	<b>ON:</b> show the camera ID with the color bars. (Normal setting) <b>OFF:</b> do not show the camera ID.
<b>ID SET</b> Used to set the camera ID (maximum of eight characters, alphanumerics, punctuation and spaces).	<b>To select the character input position</b> Operate the DISP CHG switch. Pressing it down moves the character input cursor to the right, and pressing it up moves the character input cursor to the left. <b>Note</b> An attempt to move the character input cursor to the position of the ninth character returns to the normal display. <b>To select the input character</b> Operate the UP/ON button or DOWN/OFF button.

(Continued)

## Adjustments and Settings

### White Balance Adjustment

Adjusting the white balance ensures that as lighting conditions change white objects remain white in the image and tones remain natural. The color of light emitted varies from one light source to another, and as the lighting changes the apparent color of an illuminated subject changes. It is therefore necessary to adjust the white balance each time the principal lighting source changes.

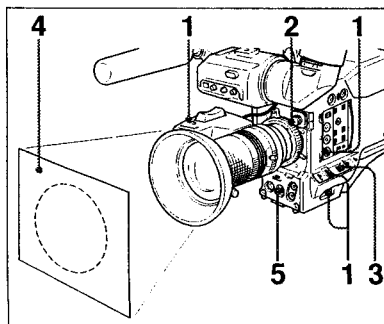
### Saving an appropriate white balance value in memory

You can save two white balance values in separate memories, A and B. Unless changed, the saved values are retained for approximately ten years, even when the camera is powered off.

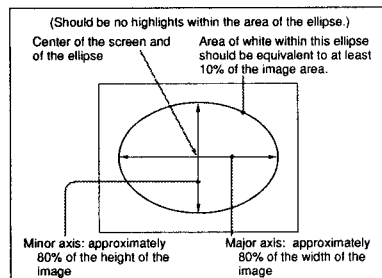
Once a value is saved, you can automatically restore the adjustment by moving the WHITE BAL switch to the A or B position. This makes shooting under alternating lighting conditions easy.

### Separate white balance values for each FILTER control setting

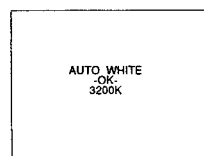
In the default case, as described above, the same two A and B white balance values apply to all settings of the FILTER control. It is possible, however, to change the AWB MEM menu setting (see page 40) so that there are eight possibly different values for each of the A and B positions and for the four FILTER control settings.



- 1 Make the following settings on the camera.
  - POWER switch: ON SAVE
  - OUTPUT/DCC switch: one of the CAM positions
  - Lens iris selector: A (automatic)
  - ATW button: off
- 2 Set the FILTER control according to the lighting conditions. (See page 31.)
- 3 Set the WHITE BAL switch to A or B.
- 4 Arrange a white subject (paper, cloth, etc.) under the same lighting conditions as for shooting, and zoom in on it so that as far as possible the whole screen is white. The minimum white area requirements for the adjustment are shown in the following figure.



- 5 Push the WHT/BLK switch in the WHT direction and release. The white balance adjustment is carried out. During the adjustment the legend "AUTO WHITE -OP-" appears in the viewfinder. After a few seconds the adjustment is complete, and the legend in the viewfinder changes to "AUTO WHITE -OK-" plus a color temperature, as shown in the following figure.



(Continued)

## Adjustments and Settings

The adjustment value is automatically saved in memory A or B as selected above.

To save the white balance adjustment for different lighting conditions, repeat steps 2 to 4 above. You can save two different values for the white balance, in memories A and B.

### Notes

- When using a camera control unit, if the W/B BALANCE switch of the camera control unit is set to PRESET or MANUAL, it is not possible to carry out white balance adjustment on the camera.
- When using a CCU-M5/M5P Camera Control Unit, make sure that the MODE switch of the CCU-M5/M5P is in the CAM position.

### To recall a white balance value from memory

Before beginning shooting, set the WHITE BAL switch to the A or B position. This automatically sets the camera to the white balance adjustment saved in the corresponding memory.

### If white balance adjustment cannot be completed automatically

The warning message "AUTO WHITE -NG-" appears in the viewfinder. Make the necessary corrections, then carry out the process again.

### Warning messages for white balance adjustment

Message	Meaning and corrections to be made
AUTO WHITE -NG- :LOW LIGHT TRY AGAIN	Light level is too low. • Increase the illumination level, open the iris, or use the GAIN switch to increase the video signal level. • Check the setting of the FILTER control. • After these checks, retry the adjustment.
AUTO WHITE -NG- :?? TRY AGAIN	The subject is not white, or the lighting level is too high. • Use a white subject. • Lower the illumination level, stop down the iris, or use the GAIN switch to decrease the video signal level. • Check the setting of the FILTER control. • After these checks, retry the adjustment.
AUTO WHITE -NG- :C.TEMP.LOW CHG.FILTER TRY AGAIN	The color temperature is too low. Try the following, in this order of precedence. (1) If the FILTER control is in position 3 or 4, change it to position 1 or 2, then retry the adjustment. (2) Check that the subject is completely white, then retry the adjustment. (3) The color temperature may be outside the range of the camera. Fit an appropriate color temperature conversion filter, then retry the adjustment.
AUTO WHITE -NG- :C.TEMP.HI CHG.FILTER TRY AGAIN	The color temperature is too high. Try the following, in this order of precedence. (1) If the FILTER control is in position 1 or 2, change it to position 3 or 4, then retry the adjustment. (2) Check that the subject is completely white, then retry the adjustment. (3) The color temperature may be outside the range of the camera. Fit an appropriate color temperature conversion filter, then retry the adjustment.
WHITE:PRESET	The WHITE BAL switch is in the PRESET position. Move the WHITE BAL switch to the A or B position.
BARS	The camera is outputting a color bar signal. Move the OUTPUT/DCC switch to one of the CAM positions.





## Using the preset white balance settings

The camera provides two preset white balance settings, for instant shooting with approximately the correct adjustment.

There are also particular shooting conditions under which the preset values may give better results than the human eye adjustment.

- 1 Set the WHITE BAL switch to PRESET.
- 2 Set the FILTER control.  
The white balance is automatically adjusted for 3200 K when the FILTER control is in position 1 or 2, and for 5600 K in position 3 or 4.

## Hints on white balance adjustment

### Light sources and color temperature

Adjustment of the white balance to match the light source is essential to ensure correct color rendering. The color of a light source is indicated as a color temperature in kelvins (K). It is higher for bluish light, and lower for reddish light. When the camera is shipped it is adjusted for use with video lights (halogen lights with a color temperature of 3200 K). For use with other light sources, therefore, adjustment is required.

First use the FILTER control to set the approximate color temperature, then carry out white balance adjustment.

The following table shows typical color temperature values for different light sources.

Color temperatures of different light sources

Light source		Color temperature (K)
Natural	Artificial	
Clear sky		10,000
Light cloud		8,000
Cloudy or rainy skies		7,000
		6,000
	Fluorescent light (daylight white)	5,000
Direct sunlight, noon	Mercury lighting	
	Fluorescent light (white)	
One hour after sunrise or before sunset	Fluorescent light (warm white)	4,000
	Studio lighting	3,500
	Halogen lamps and video lights	3,200
	Incandescent lighting	3,000
Thirty minutes after sunrise or before sunset	Sodium street-lighting	2,500
Sunrise or sunset	Candlelight	2,000

## Using the ATW (Auto Tracing White balance) function

The ATW function continuously adjusts the white balance automatically to adapt to changes in lighting conditions.

### Note

Depending on the shooting conditions, automatic adjustment may not necessarily give optimum results. For the best possible results, use the WHITE BAL switch.

### To use the ATW function

Press the ATW button turning the indicator on. This activates the ATW function, and the ATW indication appears in the viewfinder. To disable the ATW function, press the ATW button again, turning the indicator off.

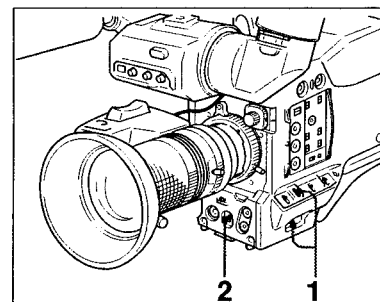
### If the ATW function does not operate correctly

A warning indication appears in the viewfinder. (See page 44.)

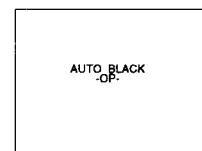
## Adjustments and Settings

## Black Balance Adjustment

Correct adjustment of the black balance is important for optimum operation of a video camera. It is necessary when using the camera for the first time or after a significant period out of use, and also when there has been a sudden change in temperature. The adjustment value is saved in memory, and readjustment is not normally necessary after powering the camera off or simply when lighting conditions change.



- 1 Move the POWER switch to the ON SAVE position, and check that the OUTPUT/DCC switch is in one of the CAM positions.
- 2 Push the WHT/BLK switch in the BLK direction and release.  
The lens iris closes, and black balance adjustment is carried out.  
During the adjustment the legend "AUTO BLACK -OP-" appears in the viewfinder.



After a few seconds the adjustment is complete, and the legend in the viewfinder changes to "AUTO BLACK -OK-".

### Notes

- When using a camera control unit, if the W/B BALANCE switch of the camera control unit is set to MANUAL, it is not possible to carry out black balance adjustment on the camera.
- When using a CCU-M5/M5P Camera Control Unit, make sure that the MODE switch of the CCU-M5/M5P is in the CAM position.

### If black balance adjustment cannot be completed automatically

The warning message "AUTO BLACK -NG-" appears in the viewfinder. Make the necessary corrections, then carry out the process again.

Warning messages for black balance adjustment

Message	Meaning and corrections to be made
AUTO BLACK -NG- : IRIS NOT CLOSED TRY AGAIN	The lens iris did not close fully. Check whether the lens cable is connected properly, and whether there is a fault in the lens. If a second attempt to carry out the adjustment fails, consult your sales representative or supplier.
AUTO BLACK -NG- : ?? TRY AGAIN	The iris opened during adjustment or there is a hardware error. Close the iris and try again. If this fails, consult your sales representative or supplier.
BARS	The camera is outputting a color bar signal. Move the OUTPUT/DCC switch to one of the CAM positions.

## Shutter Settings

This section covers the settings for electronic shutter speed and the clear scan function.

### Shutter speeds

There are five shutter speeds, from  $1/100$  s (NTSC) or  $1/60$  s (PAL) to  $1/1000$  s. Increasing the shutter speed reduces blurring when shooting a fast-moving subject. It is also possible to reduce flicker when shooting under fluorescent lighting by changing the shutter speed.

### Clear scan function

When shooting a computer screen or projected image, horizontal bands may appear in the camera image. This is because the vertical scan frequency of the computer-generated image is different from the vertical scan frequency of the video system. The clear scan function allows you to select a vertical scan frequency to reduce this interference.

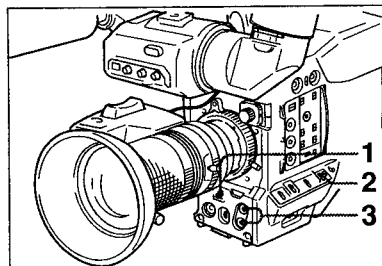
## Setting the shutter speed and clear scan function

### Notes on setting the shutter speed

- If the EVS function setting in the advanced menu is ON, it is not possible to change the shutter speed.
- The faster you make the shutter speed, the darker the image becomes. Check the brightness in the viewfinder, and if necessary increase the lighting level or adjust the iris.
- When the shutter speed is very fast, shooting a high intensity subject may cause long vertical tails to appear on the highlights (smear).

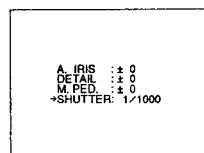
### Note on setting the clear scan function

The vertical scan frequencies of computer screens vary, and it may not be possible to eliminate the interference patterns entirely. Note also that the vertical scan frequency may change depending on the software being run.

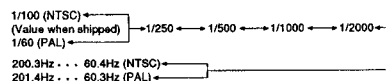


- 1 Set the SHUTTER switch to the ON position. The SHUTTER indicator in the viewfinder comes on, and it is now possible to make the shutter speed or clear scan function setting.

- 2 Operate the DISP CHG switch to align the cursor with the item "SHUTTER" in basic menu 1.



- 3 Press the UP/ON button or DOWN/OFF button to select the required shutter speed or scan frequency. Each time you press the UP/ON button or DOWN/OFF button, the shutter speed or clear scan frequency setting changes in the following order:



### When using the clear scan function

Watching the monitor screen, adjust the frequency to give minimum interference.

If there is a black band in the monitor image, reduce the frequency, and if there is a white band, increase the frequency.

The new value for the shutter speed or clear scan frequency remains set until changed, even when the camera is powered off.

## Adjustments and Settings

### To return from the basic menu to the normal indications

Press the DISP CHG switch as many times as necessary until the normal indications appear. The new setting of the shutter speed or clear scan frequency appears in the normal screen display.

### When shooting is finished

Set the SHUTTER switch to the OFF position. The SHUTTER indicator in the viewfinder goes off.

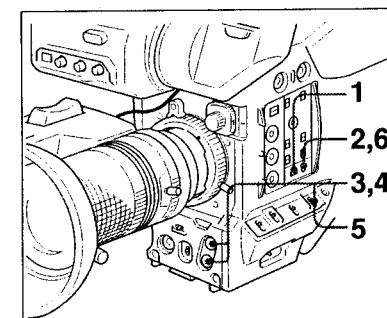
## Setting the Clock and Timestamping Recordings

By setting the internal real time clock, you can timestamp recordings by superimposing the date and time.

### Note

If after setting the clock with the following procedure the date and time do not appear in the viewfinder when you set the CLOCK switch to the ON position, the internal lithium battery is exhausted. In this event, consult your Sony service representative.

## Setting the clock



- 1 Set the CLOCK switch to the ON position. The date and time appear in the viewfinder.

- 2 Press the CLOCK SET button. The year indication flashes.

- 3 Use the DISP CHG switch and UP/ON and DOWN/OFF buttons to adjust the date and time indications.

- ① Press the DISP CHG switch up or down to make the item to be changed flash.
- ② Press the UP/ON button to change the setting.

**If you advance a numerical value too far**  
Press the UP/ON button and DOWN/OFF button simultaneously to reset the value to zero, then press the UP/ON button again to set the correct value.

- ③ Repeat steps ① and ② to set the year, month, day, hour, and minute.

- 4 Select 12-hour or 24-hour indication.

- ① Press the DISP CHG switch up or down. The AM/PM or ■ indication flashes.
- ② Press the UP/ON button to switch between 12-hour times (with the AM/PM indication) and 24-hour times (with the ■ indication).

- 5 Select the date indication order. Pressing the UP/ON button cycles through the three orders as follows. (Pressing the DOWN/OFF button cycles through in the reverse order.).  
YY-MM-DD (e.g. 95-01-25)  
MM-DD-YY (e.g. 01-25-95)  
DD-MM-YY (e.g. 25-01-95)

- 6 Press the CLOCK SET button. This starts the clock, with a seconds value of zero, so for accurate timing synchronize this press to a time signal.

**To clear the date and time display**  
Move the CLOCK switch to the OFF position.



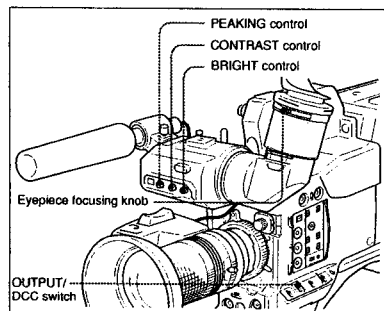
### Timestamping recordings

You can timestamp recordings by superimposing the current date and time.

- 1 Before or during shooting, move the **CLOCK** switch to the **ON** position at the point where you wish to superimpose the date and time. The date and time appear in the viewfinder, and are superimposed on the video signal output from the camera.
- 2 To stop superimposing the date and time, move the **CLOCK** switch back to the **OFF** position.

### Viewfinder Adjustments

The following adjustments are provided to improve the visibility of the viewfinder screen. Although these adjustment may make the viewfinder image clearer, they have no effect on the output video signal from the camera.



### Adjusting the eyepiece focus

Depending on the eyesight of the camera operator — whether longsighted or shortsighted — the optimal position of the viewfinder image varies. Adjust the eyepiece focus to get the clearest viewfinder image for your eyesight. First focus the image with the lens, then adjust the eyepiece focusing knob. The adjustment range is from  $-3$  to  $0$  diopters<sup>1)</sup> (default when shipped is  $0$  diopters).

Using an optional part allows you to modify the adjustment range to  $-2$  to  $+1$  diopters or  $-0.5$  to  $+3$  diopters.

For details, consult your Sony sales representative.

### Contrast and brightness adjustment

Carry out these adjustments with the color bars displayed.

- 1 Set the **OUTPUT/DCC** switch to the **BARS** position. The color bars appear in the viewfinder.
- 2 Watching the color bars, turn the **CONTRAST** and **BRIGHT** controls to adjust the contrast and brightness.
- 3 Return the **OUTPUT/DCC** switch to its original position.

### Outline emphasis adjustment

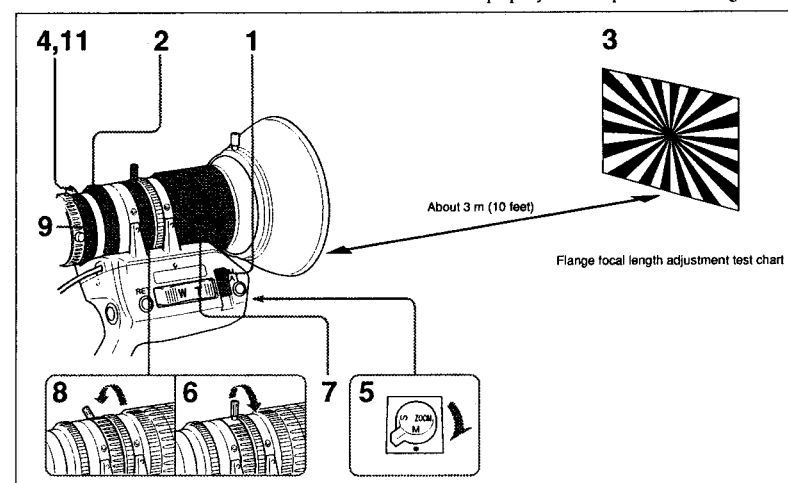
Turning the **PEAKING** control changes the degree of outline emphasis in the viewfinder image, to make focusing easier.

## Adjustments and Settings

### Flange Focal Length Adjustment

It is necessary to adjust the flange focal length (the distance from the lens flange to the plane of the image along the optical axis) in the following cases.

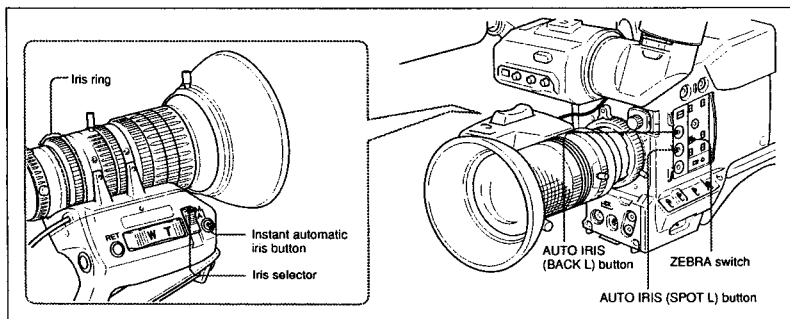
- When a lens is fitted for the first time
- After changing lenses
- When during zoom operations the focus does not match properly from telephoto to wide angle



- 1 Set the iris selector to the **M** position.
- 2 Turn the iris ring to  $f/1.8$  (fully open).
- 3 Place the supplied flange focal length adjustment test chart at a range of about 3 meters (10 feet), and adjust the lighting so that an appropriate video output level is obtained with the iris at  $f/1.8$ .
- 4 Loosen the screw of the **Ff** adjustment ring.
- 5 Set the **ZOOM** selector to the **M** position.
- 6 Move the manual zoom control to the telephoto position.
- 7 Turn the focusing ring so that the test chart is in focus.
- 8 Move the manual zoom control to the wide angle position.
- 9 Turn the **Ff** adjustment ring so that the test chart is in focus. Do not move the focusing ring.
- 10 Repeat steps 6 to 9 until the image stays in focus from telephoto to wide angle.
- 11 After adjustment, tighten the screw of the **Ff** adjustment ring.

1) **Diopter**: A unit to indicate the degree of convergence or divergence of a bundle of rays.

## Lens Iris Adjustments



There are three ways of adjusting the iris: automatically, manually, and with the instant automatic iris adjustment function.

### Iris adjustment

Adjustment method	Operation
<b>Automatic adjustment mode</b> The iris is adjusted automatically to adapt to changes in the brightness of the subject. This is the mode for normal shooting.	Set the iris selector to the A position.
<b>Manual adjustment mode</b> Use this mode in the following cases: <ul style="list-style-type: none"> <li>• For special effects</li> <li>• When filming a person with a very bright sky background</li> <li>• When shooting a subject with extreme contrast</li> </ul> The zebra pattern can be used as a guideline for iris adjustment.	Set the iris selector to the M position and turn the iris ring as required.
<b>Instant automatic adjustment function</b> While in manual adjustment mode, this function makes a temporary automatic adjustment.	With the iris selector in the M position, hold down the instant automatic iris button for as long as necessary.

### To make the image lighter when shooting against the light

In the automatic iris adjustment mode, press the AUTO IRIS (BACK L) button, turning the indicator on.

### To make the image clearer when shooting a subject lit by a spotlight

In the automatic iris adjustment mode, press the AUTO IRIS (SPOT L) button, turning the indicator on.

### Using the zebra pattern in manual adjustment mode

To use the zebra pattern as a guideline for iris adjustment in manual adjustment mode, set the ZEBRA switch to the ON position. In the viewfinder image, those portions whose intensity corresponds to a video output level of 65% to 75% are shown with a zebra pattern.

#### • When the subject is a person

Adjust the iris manually so that the zebra pattern appears on the highlights of the subject's face.

#### • For other subjects

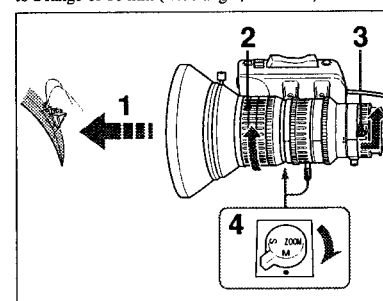
Adjust the iris manually so that the zebra pattern appears on the most important parts of the subject.

It is possible to change the level for the zebra pattern to those parts of the image above 100% by a menu setting. (See page 40.)

## Adjustments and Settings

### Macrophotography

Use the macro function when the subject is less than about 90 cm (3 feet) (for the VCL-916BYA) from the front of the lens. It is possible to shoot close-ups down to a range of 10 mm (wide angle,  $f = 9$  mm).



- 1 Bring the lens up to the subject so that the image is the required size.
- 2 Move the focusing ring to the closest focus position.
- 3 Slide the MACRO button toward the rear of the camera, and turn the MACRO ring fully in the direction shown by the arrow.
- 4 Move the ZOOM selector to the M position, and turn the manual zoom control to focus the image.

### Ending close-up shooting

Return the MACRO ring to its original position (turn fully in the opposite direction to the arrow in the figure).

### Reducing the size of the image

After completing steps 1 to 4 above, if you wish to reduce the size of the image, turn the MACRO ring back slightly, then use the manual zoom control again to focus the image.



## Settings for Special Cases

Settings for special cases

Shooting conditions	Setting	Effect
The background is very bright, and the subject is too dark.	Press the AUTO IRIS (BACK L) button, turning the indicator on.	This lightens the foreground.
The subject is under a spotlight.	Press the AUTO IRIS (SPOT L) button, turning the indicator on.	This prevents white burn-out in highlights of faces and clothes.
The subject is completely still (e.g. when shooting documents, drawings, etc.).	Enable the EVS (Enhanced Vertical definition System) function. (See page 41.) <b>Note</b> Enabling the EVS function tends to increase the occurrence of aliasing problems (moiré patterns). Therefore, normally leave the function disabled.	This enhances the vertical resolution.
When you wish to give a lush effect, as when shooting a wedding or similar occasion.	Move the MATRIX switch to the H. SAT position.	This increases the saturation of primary colors.
Shooting under fluorescent lighting.	Move the MATRIX switch to the FL position.	This eliminates the blue-green cast, and restores natural hues.
To use white burn-out as a special effect. (For example, shooting against the light in a desert scene of a person walking.)	Move the OUTPUT/DCC switch to the CAM/DCC OFF position.	This allows overexposure, so that the background appears all-white.
To make focusing before shooting easier.	Press the EZ FOCUS button, turning the "easy focus" function on.	This opens the iris, to make it easier to focus before beginning shooting.
To begin shooting immediately when there is no time to make adjustments.	Set the EZ MODE switch to the ON position.	This provides automatic adjustment to a set of standard values, to allow immediate shooting.

## Warning Indications

If a fault occurs during operation, a warning is given by the REC/TALLY and BATT indicators in the viewfinder and the tally lamp lighting or flashing, and also by warning indications on the viewfinder screen. When you are using an EVV-9000/9000P, PVV-3/3P,

BVV-5/5PS or similar VTR, the WARNING indicator on the VTR also lights or flashes, and warning indications appear in the display window. There is also a warning tone in the earphone.

Warning indications

Camera			VTR			Warning tone	Fault	VTR action	What to do
REC/TALLY indicator and tally lamp	BATT indicator	Viewfinder screen indication	WARNING indicator	Display window					
					Four beeps per second One beep per second Continuous				
	—	—		RF (during recording only)	●●●●●● (During recording only)		The video heads are clogged, or there is some other fault in the recording system.	The VTR emits a warning tone when it detects head clogging.	Carry out head cleaning, referring to the instruction manual for the VTR. If the problem persists after cleaning the heads, disconnect the power and consult your Sony service representative.
	—	—		SERVO	●●●●●●		The servo lock has been lost.	Recording continues, but the recording may not be satisfactory.	Disconnect the power and consult your Sony service representative. (The SERVO indication may flash momentarily when the tape transport starts, but this does not indicate a problem.)
	—	—		HUMID	●●●●●● (During recording) ●●●●●● (During playback, rewind, or fast forward)		There is condensation.	Recording continues, but if the tape sticks to the drum, recording stops. Playback, rewind, or fast forward stops.	Stop the tape transport. Wait until the HUMID indication does not appear when you power the unit on.
	—	—		SLACK	●●●●●● (During recording)		The tape is not wound properly.	The operation stops. (Refer to the service manual or maintenance manual.)	Press the EJECT button to eject the cassette. Close the cassette compartment and check that the top panel has descended before powering off. Then consult your Sony service representative. (Do not attempt to insert any cassette.)
	—	—		TAPE (flashing, during recording only)	●●●●●● (During recording only)		The tape is near the end.	Operation continues.	Change the cassette if necessary.
	—	—		TAPE (flashing)	●●●●●● (During playback, rewind, or fast forward)		The tape is at the end.	Recording, playback, and fast forward all stop.	Change the cassette.
		BATT 11.0V		BATT (flashing)	●●●●●● (During recording)		The battery is almost exhausted.	Operation continues.	Change the battery when possible.
		BATT 10.5V		BATT (flashing)	●●●●●● (During playback, rewind, or fast forward)		The battery is exhausted.	Operation stops.	Change the battery.

Continuous Flashing once per second Flashing four times per second

For the warnings appearing in the viewfinder when a PVV-3/3P is connected, see the section "Viewfinder Normal Indications" (page 35).

## Specifications

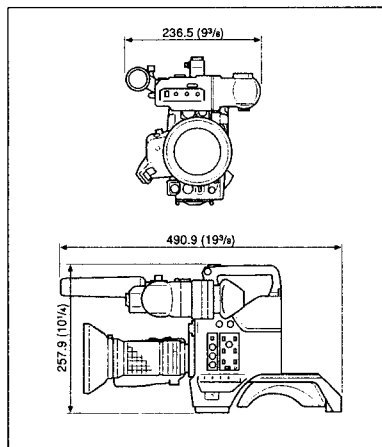
### DXC-637/637P Camera Head

Imaging element	Three-chip interline transfer CCD
Pixel resolution	768 (horizontal) × 493 (vertical) (NTSC) 786 (horizontal) × 581 (vertical) (PAL)
Imaging area	8.8 × 6.6 mm (corresponds to 2/3-inch picture tube)
Built-in filter settings	1: 3200K 2: CROSS (four-point starburst) 3: 5600K 4: 5600K + 1/16ND
Lens mount	Bayonet mount
Signal standards	EIA standard signal (NTSC color system) (DXC-637) CCIR standard signal (PAL color system) (DXC-637P)
Scanning system	525 lines, 2:1 interlace (NTSC) 625 lines, 2:1 interlace (PAL)
Scanning frequencies	Horizontal: 15.734 kHz (NTSC) 15.625 kHz (PAL) Vertical: 59.94 Hz (NTSC) 50.00 Hz (PAL)
Synchronization	Internal sync External sync, using signal input (VBS or BS) to the GEN LOCK IN connector of an optional camera adaptor or input from the GEN LOCK connector of a CCU-M5/M5P/M7/M7P camera control unit to the VTR/CCU/CMA connector of an optional camera adaptor.
Horizontal resolution	800 TV lines (center)
Minimum illumination	1 lux (at f/1.4, +36 dB) 1.5 lux (at f/1.8, +36 dB)
Sensitivity	2000 lux (f/8.0 standard, 3200 K)
Video output levels	Selectable -3 dB, 0 dB, 3 dB, 6 dB, 9 dB, 12 dB, 18 dB, 24 dB
Video output	Composite signal 1.0 Vp-p, sync negative, 75 Ω, unbalanced

#### Y/C separate signals

Y: 1.0 Vp-p, sync negative, unbalanced  
C: burst level 0.286 Vp-p, no sync

Video S/N ratio	63 dB (typical) (NTSC) 61 dB (typical) (PAL)
Registration	0.05% for all zones, without lens
Input/output connectors	VIDEO OUT connector: BNC, 75 Ω, unbalanced LENS connector: 12-pin, for 2/3-inch lens VF connector: 8-pin REMOTE connector: 10-pin MONITOR OUT connector: Phono jack, 75 Ω, unbalanced
Power supply	12 V DC
Power consumption	12.0 W
Operating temperature	-10 °C to +45 °C (14 °F to 113 °F)
Storage temperature	-20 °C to +60 °C (-4 °F to 140 °F)
Mass	2.3 kg approx. (5 lb 1 oz)
External dimensions in millimeters (inches)	



## Specifications

### VCL-916BYA Zoom Lens

Focal length	9.0 to 144 mm
Zoom	Manual or power, selectable; zoom ratio: ×16
Maximum aperture	1:1.8
Iris	Manual or automatic, selectable; f/1.8 to f/16 and C (closed)
Subject area (at 0.9 m (3 feet))	Wide angle: 815 × 611 mm (32 × 24 inches) Telephoto: 51 × 38 mm (2 × 1 1/2 inches)
Focusing range	Infinity to 0.9 m
Filter attachment threads	77 mm dia., 0.75 mm pitch (on lens) 86 mm dia., 1 mm pitch (on lens hood)
Mounting	Sony 2/3-inch bayonet mount
Mass	1.2 kg approx. (2 lb 10 oz) (excluding lens hood)
External dimensions	120 × 197 mm (diameter × length) (4 3/4 × 7 7/8 inches) (with lens hood, focused at infinity)

### DXF-601/601CE Viewfinder

Picture tube	1.5-inch monochrome
Indicators	REC/TALLY, BATT, SHUTTER, GAIN UP
Resolution	600 TV lines
Power supply	12 V DC
Power consumption	2.1 W
Mass	660 g approx. (1 lb 7 oz)
Maximum external dimensions	236 (W) × 85 (H) × 219 (D) mm (9 3/8 × 3 3/8 × 8 5/8 inches)

### Supplied accessories

VCL-916BYA Zoom Lens<sup>1)</sup> (1)  
DXF-601/601CE Viewfinder<sup>2)</sup> (1)  
Microphone<sup>2)</sup> (1)  
Wind screen<sup>2)</sup> (1)  
VCT-U14 Tripod Adaptor<sup>2)</sup> (1)  
Lens mount cap (1)  
Flange focal length adjustment test chart (1)  
Operating Instructions (1)

Design and specifications are subject to change without notice.

### Related Products

There is a range of Sony products available to meet every conceivable video shooting requirement. For details, consult your Sony sales representative or supplier.

#### Lenses

VCL-915BYA/916BY/1012BY Zoom Lens

#### Camera adaptor products

CA-325A/325AP/325B/327/327P/511/512<sup>3)</sup>/512P<sup>3)</sup>/513/537/537P Camera Adaptor  
CMA-8A/8ACE Camera Adaptor  
RM-M7G Camera Remote Control Unit

#### VTR products

EVV-9000/9000P Video Cassette Recorder  
PVV-1/1P/1A/1AP/3/3P Portable Video Cassette Recorder  
VO-8800/8800P Portable Video Cassette Recorder  
BVU-150/150P Portable Video Cassette Recorder  
BVV-5/5PS Video Cassette Recorder  
BVW-50/50P Portable Video Cassette Recorder  
VA-5/5P/90/90P VTR Adaptor

#### Battery products

NP-1B/1A Battery Pack  
BP-90A Battery Pack  
BC-1WD/1WB/410 Battery Charger

1) DXC-637K/637PK only  
2) DXC-637K/637L/637PK/637PL only

3) When connecting a CA-512/512P, remove the blank panel on the CA-512/512P.

ECM-670/672 Condenser Microphone  
C-74 Condenser Microphone  
CAC-12 Microphone Holder  
EC-0.5C2 Microphone Cable  
EC-0.3C2 Microphone Cable

### Studio equipment

CCU-M3/M3P/M5/M5P/M7/M7P Camera Control Unit  
SEG-2550A/2550AP Special Effects Unit  
CRK-2000/2000P Chroma Keyer  
WEX-2000 Wipe Pattern Extender  
DXF-50B/50BCE 5-inch Viewfinder (monochrome)  
DXF-40B/40BCE 4-inch Viewfinder (monochrome)  
DR-100 Intercom Headset  
RMM-1800 Rack Mounting Kit

### Cables and miscellaneous

The suffix number on a cable part number indicates the length in meters: e.g. a CCZ-A2 is 2 meters long. (Approximate equivalents in feet: 2 m = 6 ft, 5 m = 16 ft, 10 m = 33 ft, 25 m = 82 ft, 50 m = 164 ft, 100 m = 328 ft)

Camera cables with Z-type 26-pin connectors  
CCZ-A2/A5/A10/A25/A50/A100

Camera cables with Q-type 14-pin connectors  
CCZQ-A2/A5/A10/A2AM

CCZZ-1B/1E Cable Extension Connector  
Camera cables with Q-type 14-pin connectors  
CCQ-2BRS/5BRS/10BRS

CCQ-10AM/25AM/50AM/100AM  
CCZI-2 Camera Cable with Z-type 26-pin connector  
and J-type 10-pin connector

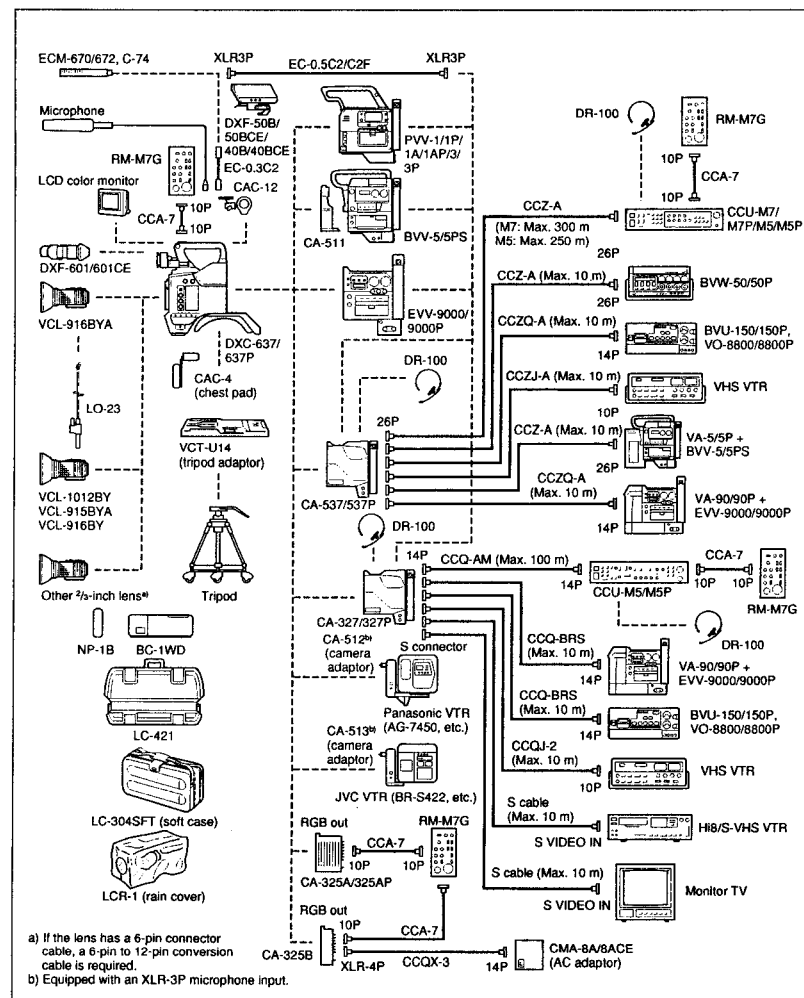
LC-421 Carrying Case

LCR-1 Rain Cover

### CAC-4 Chest Pad

**LC-304SFT Soft Case**

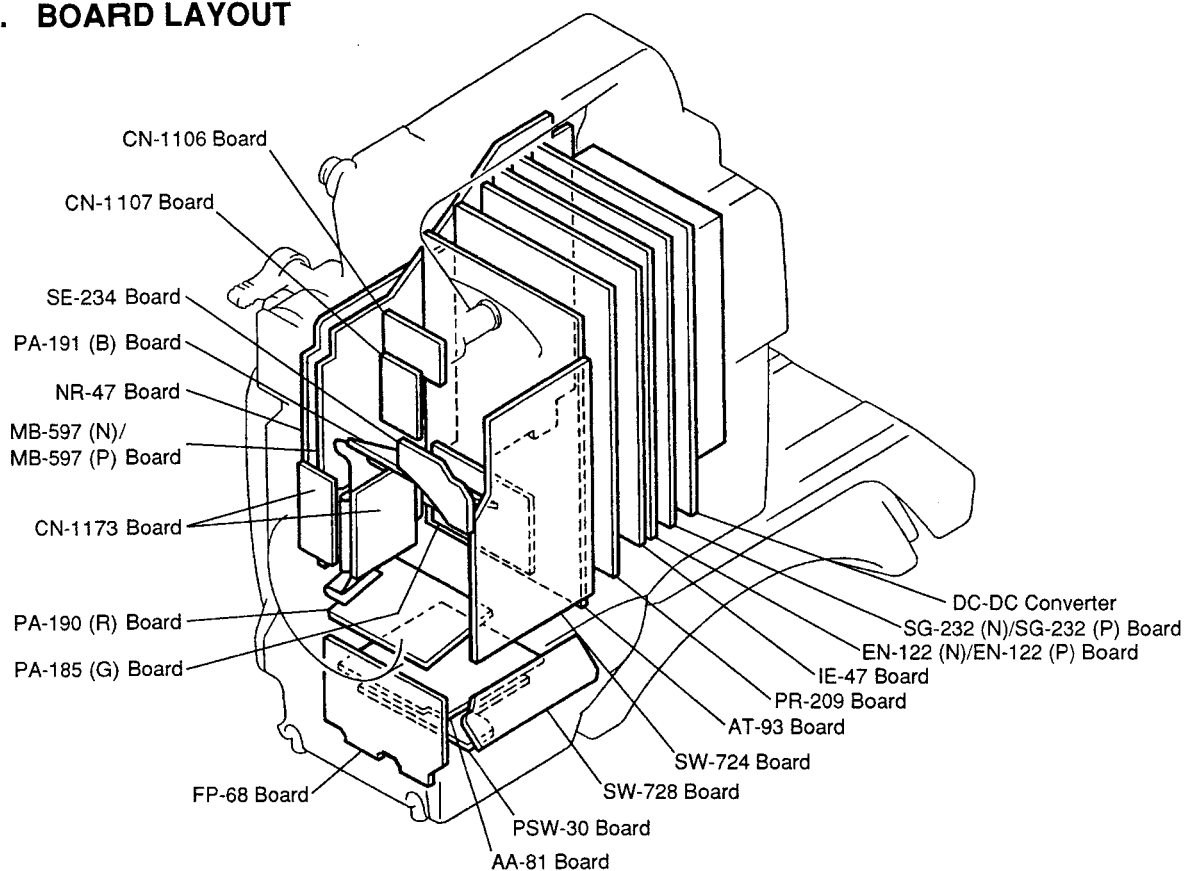
## Chart of Optional Components and Accessories



## SECTION2

### SERVICE INFORMATION

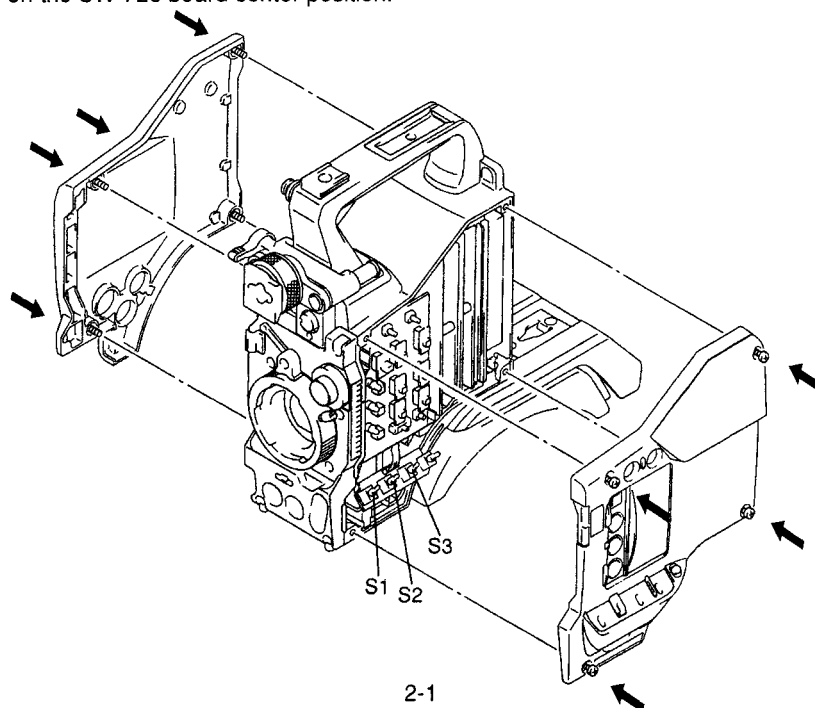
#### 2-1. BOARD LAYOUT



#### 2-2. REMOVAL OF CABINET

Loosen the four screws respectively to remove the side plates.

**Note:** Before installing the right side plate, set both of switches S1, S2 and S3 on the SW-728 board center position.





## 2-3. REPLACEMENT OF MAIN PARTS

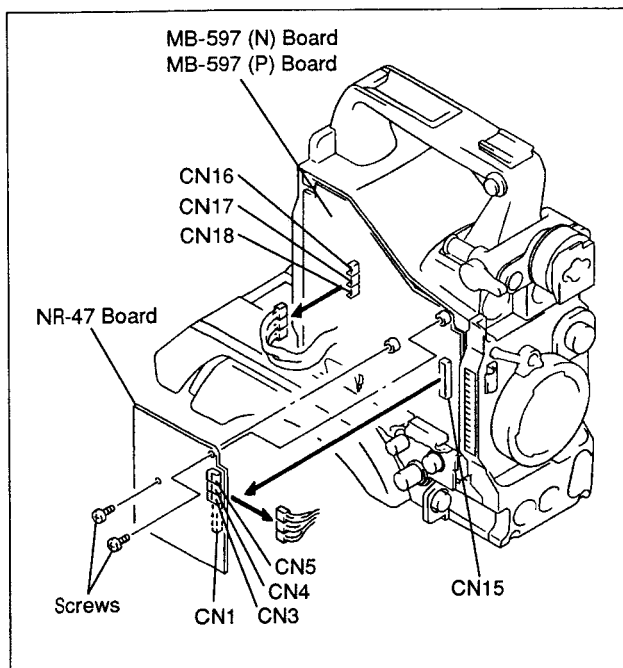
### 2-3-1. Replacement of CCD Unit

**Note:** To replace the CCD unit, the CCD unit and NR-47 board should be replaced at the same.

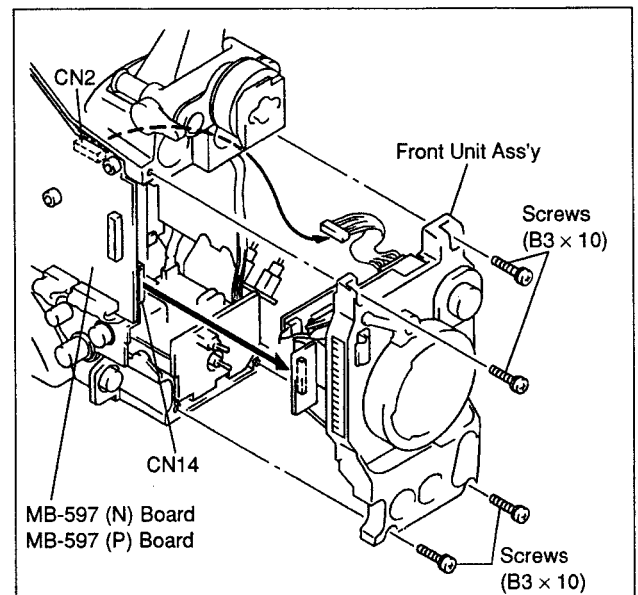
1. Remove the lens and viewfinder referring to the instruction manual.

**Note:** Attach a mount cap to the lens mount to protect the prism block.

2. Remove the left side plate referring to Section 2-2 "REMOVAL OF CABINET".
3. Remove two screws as shown in Figure. Disconnect the four connectors, CN1 and CN3 to CN5 on the NR-47 board. And remove the NR-47 board. Disconnect the three connectors, CN16 to CN18 on the MB-597 (N)/597 (P) board.

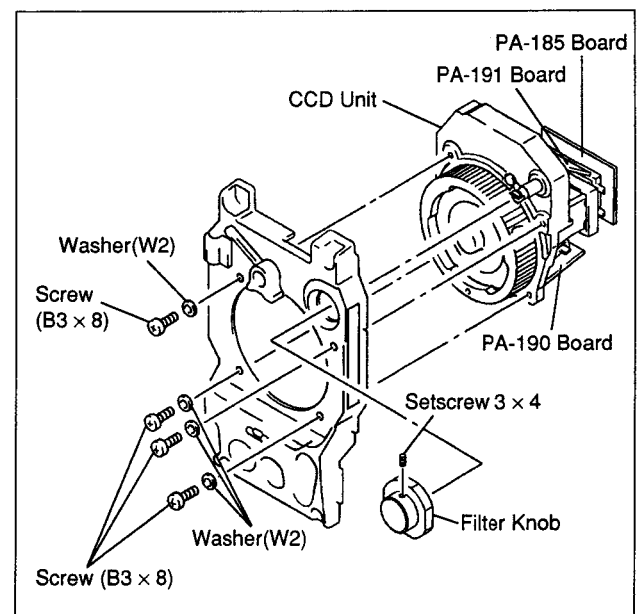


4. Remove four screws (B3 x 10). Disconnect the two connectors, CN2 and CN14 on the MB-597 (N)/597 (P) board. And pull out the Front unit Ass'y.



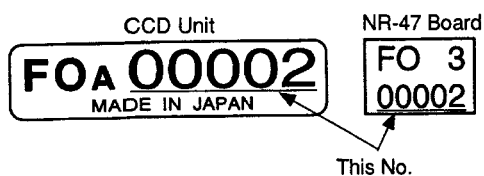
5. Remove setscrew (3 x 4) and remove the filter knob. Remove four screws (B3 x 8) and washers. And remove the CCD unit from the Front unit Ass'y.

**Note:** When handling the CCD unit, pay attention not to stress each PA board.



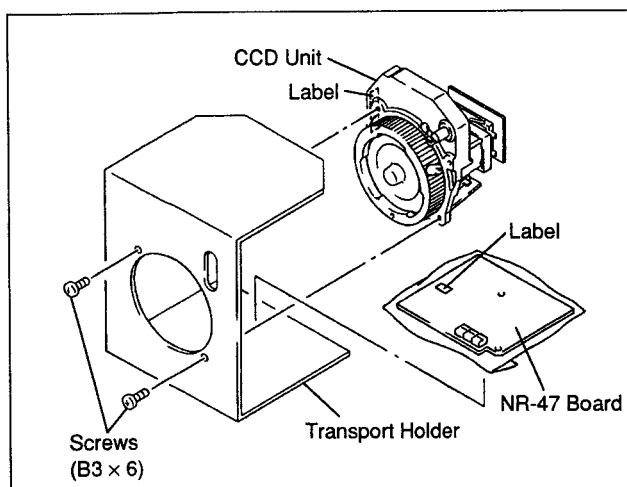
6. Remove the CCD unit and NR-47 board from transport holder for replacement CCD unit supplied from the Sony Part Center.

Confirm that the in the label shielded on the CCD unit coincided the in the label shielded on the NR-47 board.



When installing a new CCD unit, reverse the above procedures.

**Note:** When transporting the CCD unit that was removed from the unit, reuse the transport holder.



## 2-4. CONNECTORS AND CABLES

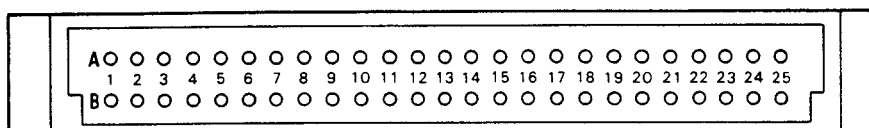
### 2-4-1. Connector Input/Output Signals

The main connector input/output signals are as follows:

**MONITOR OUT (JACK);** 1.0 Vp-p  $\pm$  0.1 V, sync negative 75 $\Omega$

**VIDEO OUT (BNC);** 1.0 Vp-p  $\pm$  0.1 V, sync negative 75 $\Omega$

**CAMERA/CA (50P)**



(EXTERNAL VIEW)

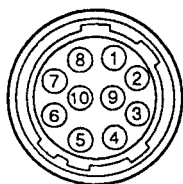
Pin No.	Signal	Specification
A1	MODE ID	OPEN: COMP, GND: R/G/B
B1	GND (CHASSIS)	
A2	MIC (Y) OUT	-60 dBm
B2	MIC (X) OUT	
A3	MIC (G) OUT	
B3	(SPARE)	
A4	REC TALLY IND IN	$Z_i \geq 600\Omega$
B4	(SPARE)	
A5	VTR START/STOP OUT	
B5	(SPARE)	
A6	BETACAM V-C IN	$Z_i \geq 47\text{ k}\Omega$
B6	BETACAM C-V OUT	$Z_o \leq 1\text{ k}\Omega$
A7	BETACAM CLK IN	$Z_i \geq 47\text{ k}\Omega$
B7	BETACAM CS IN	$Z_i \geq 47\text{ k}\Omega$
A8	GENLOCK VIDEO (G) IN	$Z_i \geq 1\text{ k}\Omega$
B8	GENLOCK VIDEO (X) IN	
A9	SYNC (G) OUT	H : 4.0~5.5 Vp-p : NEGATIVE
B9	SYNC (X) OUT	L : $0 \pm 0.4\text{ Vdc}$ $Z_o \leq 2\text{ k}\Omega$
A10	PB RET VIDEO (G) IN	$Z_i \geq 10\text{ k}\Omega$
B10	PB RET VIDEO (X) IN	
A11	COLOR FRAMING PULSE	H : 4.0~5.5 Vp-p $Z_o \leq 2\text{ k}\Omega$ L : $0 \pm 0.4\text{ Vdc}$
B11	VF VIDEO CONT IN	CAM : OPEN $Z_i \geq 1\text{ k}\Omega$ , PB : 0 V
A12	VBS (G) OUT	1.0 Vp-p, SYNC NEGATIVE
B12	VBS (X) OUT	$Z_o = 75\Omega \pm 5\%$
A13	VTR SAVE CONT OUT	STBY : 4.0~5.5 Vp-p $Z_o \leq 100\Omega$ SAVE : $0 \pm 0.25\text{ V}$
B13	VTR/CCU CONT OUT	VTR : $0 \pm 0.25\text{ V}$ $Z_o \leq 1\text{ k}\Omega$ CCU : $5.0 \pm 0.5\text{ V}$

Pin No.	Signal	Specification
A14	CHROMA (G) OUT	NTSC: 0.286 Vp-p $\pm$ 10% PAL: 0.300 Vp-p $\pm$ 10% $Z_o \leq 75\Omega \pm 5\%$
B14	CHROMA (X) OUT	
A15	Y (G) OUT	1.0 Vp-p, SYNC NEGATIVE
B15	Y (X) OUT	$Z_o \leq 75\Omega \pm 5\%$
A16	VIDEO GND OUT	R/G/B
B16	R/R-Y VIDEO OUT	1.4 Vp-p, POSITIVE
A17	G/Y VIDEO OUT	$Z_o \leq 75\Omega \pm 5\%$
B17	B/B-Y VIDEO OUT	COMPONENT OUT *1
A18	BATT ALARM/S. DATA	
B18	REC REVIEW CONT OUT	GND; REC REVIEW
A19	(SPARE)	
B19	(SPARE)	
A20	+8.5 V OUT 9.0 V	8.3 V~9.1 V
B20	+5 V OUT	$\pm 0.1\text{ V}$
A21	-5 V OUT	$\pm 0.1\text{ V}$
B21	GND	REG, GND
A22	POWER +12 V DC IN	10.6 V to 17.0 Vdc
B22	POWER +12 V DC IN	
A23	POWER +12 V DC GND	GND for $\pm 12\text{ Vdc}$
B23	POWER +12 V DC GND	
A24	(SPARE)	
B24	(SPARE)	
A25	GND (CHASSIS)	CHASSIS GND
B25	GND (CHASSIS)	


\*1

	UC	EK
Y	0.714 Vp-p	0.700 Vp-p
R-Y	0.700 Vp-p	0.525 Vp-p
B-Y	0.700 Vp-p	0.525 Vp-p

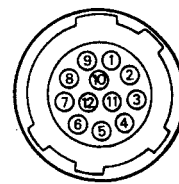
# REMOTE (10P, FEMALE)



(EXTERNAL VIEW)

Pin No.	Signal	Specification
1	(SPARE)	
2	VBS (RM) (X)	1.0 Vp-p, SYNC NEGATIVE
3	VBS (RM) (G)	
4	(SPARE)	
5	VTR START/STOP IN	$Z_i \geq 10 \text{ k}\Omega$  OPEN ( $4.5 \pm 0.5 \text{ V}$ ) ..... $0 \pm 0.5 \text{ V}$
6	S. DATA (X)	0 to 5 V $Z_i \geq 10 \text{ k}\Omega$
7	S. DATA GND	GND for S. DATA
8	REC TALLY IND OUT	$Z_o \geq 600 \Omega$
9	POWER +12 V DC GND	GND for +12 Vdc
10	POWER +12 V DC OUT	10.6 V to 17.0 Vdc

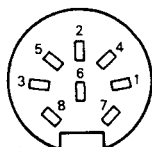
# LENS (12P, FEMALE)



(EXTERNAL VIEW)

Pin No.	Signal	Specification
1	VF VIDEO CONT IN	ON : $0 \pm 0.5 \text{ Vdc}$
2	VTR START/STOP IN	TRIG : $0 \pm 0.5 \text{ V}$
3	POWER +12 V DC GND	GND for +12 Vdc
4	COMPULSORY AUTO IRIS CONT OUT	AUTO : $4.5 \pm 0.5 \text{ V}$ MANU : $0 + 0.5 \text{ V}$ or OPEN
5	IRIS CONT OUT	F16 : 3.4 Vdc F2.8 : 6.2 Vdc
6	POWER +12 V DC OUT	10.6 V to 17.0 Vdc
7	IRIS POSI IN	F16 : $3.4 \pm 0.1 \text{ Vdc}$ F2.8 : $6.2 \pm 0.1 \text{ Vdc}$
8	REMOTE/LOCAL OUT	REMOTE : 5 V LOCAL : 0 V
9	(SPARE)	
10	(SPARE)	
11	(SPARE)	
12	(SPARE)	

# VF (8P, FEMALE)



(WIRING SIDE)

Pin No.	Signal	Specification
1	POWER +12 V DC GND	GND for +12 Vdc
2	REC TALLY IND OUT	$Z_o \leq 1.1 \text{ k}\Omega$
3	E. SHUTTER IND OUT	$Z_o \leq 1.1 \text{ k}\Omega$
4	VF VIDEO (G) OUT	GND for VF VIDEO
5	BATT IND OUT	$Z_o \leq 1.1 \text{ k}\Omega$
6	VF VIDEO (X) OUT	$V = 1 \text{ Vp-p}$
7	POWER +12 V DC OUT	10.6 V to 17.0 Vdc
8	GAIN UP IND OUT	$Z_o \leq 1.1 \text{ k}\Omega$

# MIC (3P, FEMALE)



(EXTERNAL VIEW)

Pin No.	Signal	Specification
1	MIC (G) IN	GND for MIC
2	MIC (X) IN	-60 dB
3	MIC (Y) IN	BALANCED (0 dB = 0.775 V)

## 2-4-2. Connection Connector

Connections made with the connector panels during installation or service, should be made with the connectors or complete cable assemblies specified in the following list, or equivalent parts.

Connector Name	Parts No. and name of connector with cable
REMOTE (10P, FEMALE)	1-506-522-11 CONNECTOR, ROUND 10P, MALE HIROSE HR 10A-10P-10P equality or CCA-7-20 Cable assembly (optional)
VIDEO OUT (BNC)	1-560-661-11 PLUG, BNC
VF (8P, FEMALE)	9-994-797-01 CABLE, VF
LENS (12P, FEMALE)	1-564-360-11 CONNECTOR, 12P, MALE HIROSE HR 10-10PA-12P equality
MIC (3P, FEMALE)	1-508-084-31 CONNECTOR, 3P, MALE CANNON XLA-3-12C equality



## SW-724 board

### • S11 (ADJ ON/OFF)

When set to "ON" (up side), the unit is put into ADJ mode, and various adjustments can be performed.

This switch is factory-set to "OFF" (CN1 side).

### [Procedures]

1. When S11 is set to "ON", characters displayed on the VF screen are all erased and the screen ① will be displayed.  
(In clock setting, the screen ① will be displayed after setting is complete.)
2. 1) While the screen ① is displayed, by pressing the UP/ON button on the front of camera, data in a memory "EEPROM" is preset as shown in the table and then the screen ② is displayed. Next the screen ③ is displayed and the unit enters the ADJ mode.

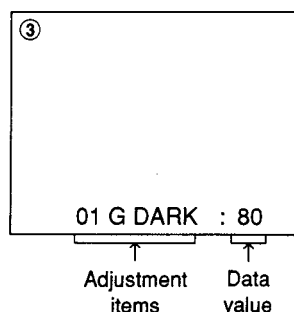
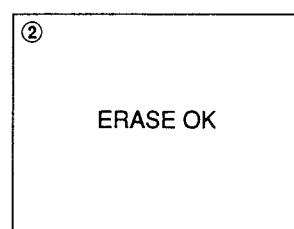
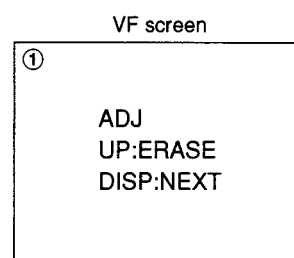
ITEMS (BASIC MENU)	PRESET VALUES
R/G/B DARK	Adjusted value is preset
AUTO WHT A/B	Adjusted value is preset
A.IRIS	Setting value is preset
DTL	Setting value is preset
M.PED	Setting value is preset
SHUTTER SPEED	1/100 (NTSC), 1/60 (PAL)
GAIN SW setting	0/9/18 dB

ITEMS (ADVANCED MENU)	PRESET VALUES
SC PHASE	000
H PHASE	100
MARKER	CENT/90%
ZEBRA	70%
TONE	ON
DCC+	ON
VF S DTL	ON
EZ MODE	STD
AWB MEM	2
BARS (NTSC)	SMPTE
EVS	OFF
LL IND	ON
IRIS IND	ON
GAIN IND	ON
FILTER IND	ON
MIC IND	ON
AUDIO IND	ON
TAPE IND	ON
TC IND	ON
ID IND	OFF

- 2) While the screen ① is displayed, press down the DISP CHG switch. The screen ③ will be displayed and the unit enters the ADJ mode.
3. 1) While the screen ③ is displayed, by pressing the UP/ON or DOWN/OFF button, data value will be varied from 00h to FFh.  
2) While the screen ③ is displayed, by pressing both the UP/ON and DOWN/OFF buttons simultaneously, data value show "80h".
4. By using the DISP/CHG switch, adjustment items is changed from 01h to 18h.

### [Adjustment items]

01 G DARK	09 B SHAD BAL	11 R VA GAIN
02 G BLACK1	0A G H SAW	12 B VA GAIN
03 R DARK	0B R H SAW	13 M PRE KNEE
04 R BLACK1	0C B H SAW	14 R PRE KNEE
05 B DARK	0D G V SAW	15 B PRE KNEE
06 B BLACK1	0E R V SAW	16 ZEBRA (70%)
07 G SHAD BAL	0F B V SAW	17 ZEBRA (100%)
08 R SHAD BAL	10 G VA GAIN	18 MIC LEVEL



- **S16 (FLD/FRM)**

A CCD read mode is selected, field (FLD) or frame (FRM) integration mode. The switch is factory-set to "FLD" position.

**Note:**

When the EVS item of advanced menu is set to ON, the electronic shutter does not function.

However, with the switch S16 set to "FRM", electronic shutter can be used under improved vertical resolution. In this condition, CCD sensitivity decreases by half compared to the field integration mode.

When electronic shutter is OFF, a sensitivity does not change and the vertical resolution is increased. On the other hands, more after-images appear because of an accumulation time of 1/30 seconds.

**For other switches on SW-724 board, refer to the instruction manual.**

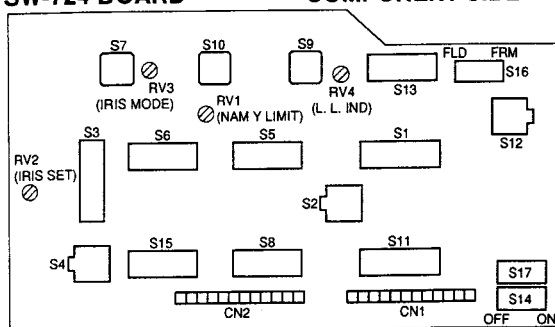
**EN-122 (N)/122 (P) board**

- S1 (V BLKG SEL 19H/20H/21H)... DXC-537A (NTSC) only

This switch selects V blanking width.

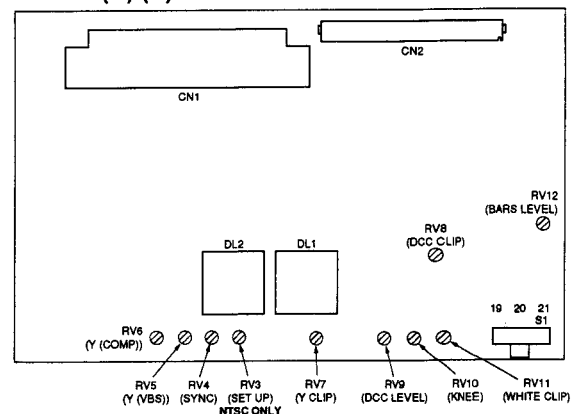
The switch is factory-set to "20H".

**SW-724 BOARD — COMPONENT SIDE —**



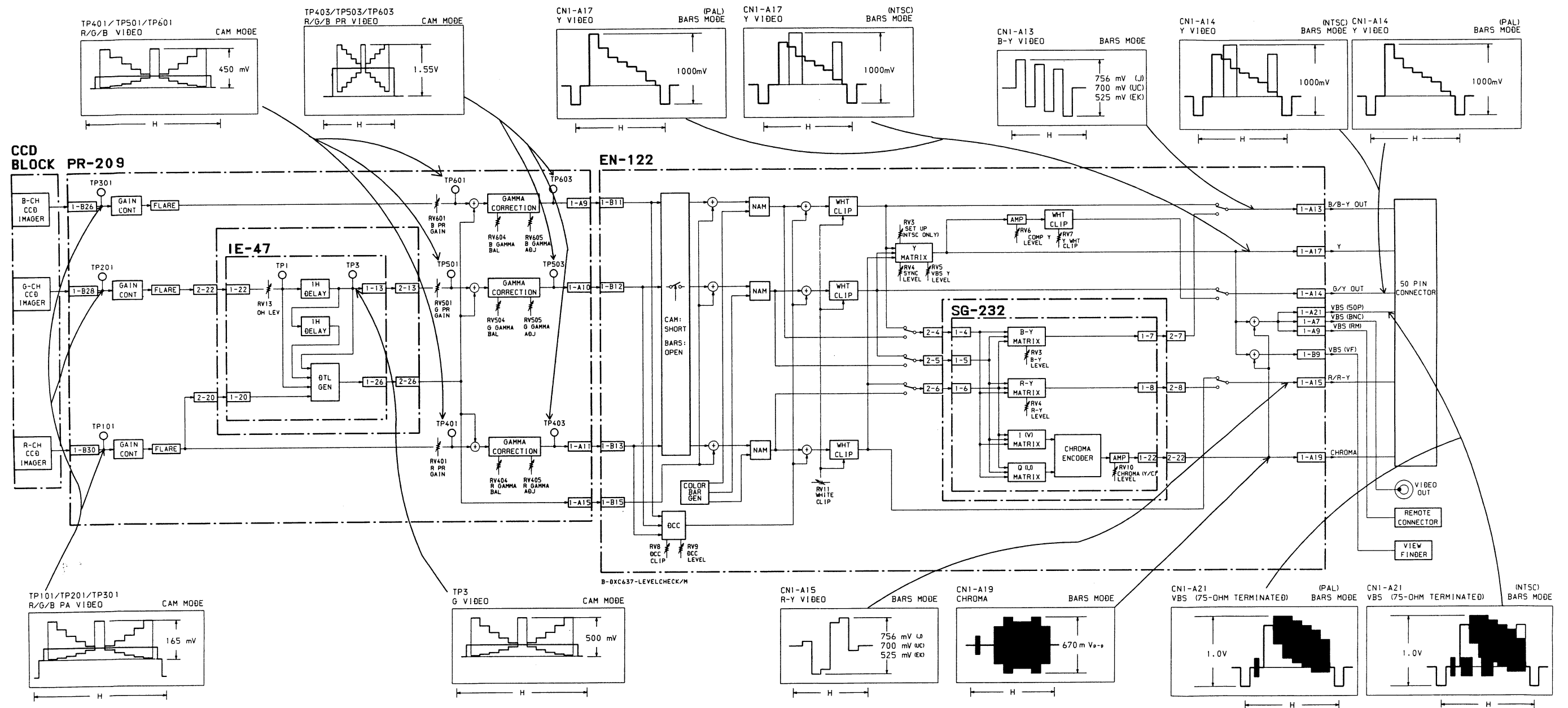
DXC-637 (UC)  
DXC-637P (EK)

**EN-122 (N)/(P) BOARD — COMPONENT SIDE —**









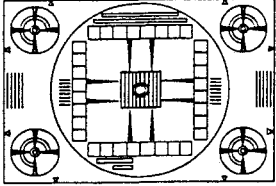
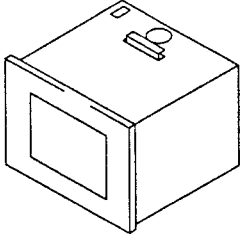
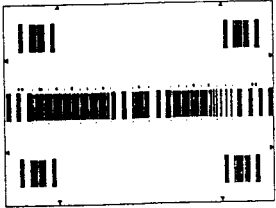
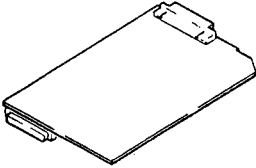
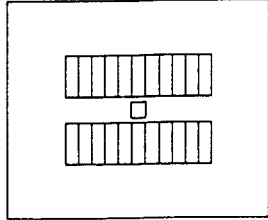
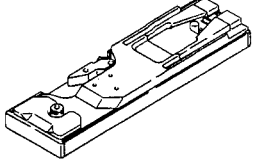
# SECTION 3

## ALIGNMENT

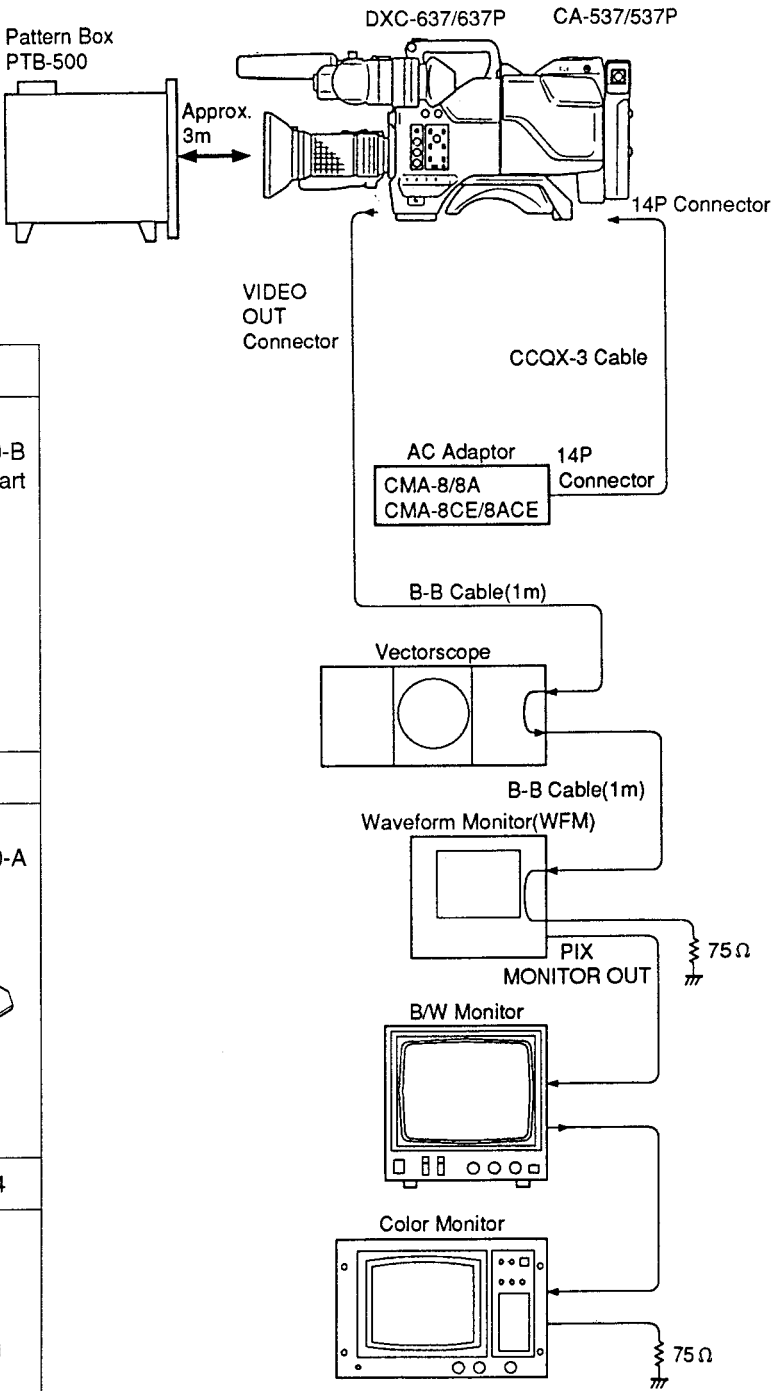
### 3-1. PREPARATION

#### 3-1-1. Equipment Required

- Digital voltmeter
- Oscilloscope (100 MHz or more)
- Vectorscope
- Waveform monitor
- B/W monitor (Sony PVM-91/122 or equivalent)
- Color monitor (Sony PVM-1320 or equivalent)
- AC Adaptor (Sony CMA-8/8A/8CE/8ACE)
- Camera Adaptor (Sony CA-537/537P)
- Frequency counter

<p>Resolution chart</p> <p>Sony part number: J-6026-100-A</p> 	<p>Pattern box PTB-500</p> <p>Sony part number: J-6029-140-B</p> <ul style="list-style-type: none"> <li>• Light source for test chart</li> </ul> 
<p>Multi-burst chart</p> <p>Sony part number: J-6026-110-A</p> 	<p>extension board EX-461</p> <p>Sony part number: J-6275-290-A</p> 
<p>Grayscale chart</p> <p>Sony part number: J-6026-130-B</p> 	<p>Tripod Adaptor VCT-U14</p> 

#### 3-1-2. Connection



### 3-1-3. Switch Setting Before Adjustment

Switch setting for camera side

GAIN switch : 0 dB  
 OUTPUT switch : CAM/DCC OFF  
 WHITE BAL switch : PRESET  
 FILTER control : 1  
 SHUTTER switch : OFF  
 ZEBRA switch : OFF  
 MARKER switch : OFF  
 HYPER GAIN switch : OFF  
 MATRIX switch : STD  
 EZ MODE switch : OFF

IRIS (Lens) : Manual  
 ZOOM (Lens) : Manual

EN-122 board

S1 (V BLKG 19H/20H/21H): 20H (NTSC model only)

PR-209 board

S602 (MATRIX ON/OFF) : OFF

IE-47 board

S1 (DTL ON/OFF) : OFF

SW-724 board

S7 (ATW) : OFF

S14 (ADJ) : ON

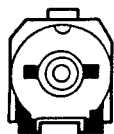
S16 (FLD/FRM) : FLD

**Note:** After adjustment, set S14 (ADJ)/SW-724 board to OFF.

### 3-1-4. Notes on Adjustment

**Note:**

- (1) As the following adjusting control has no turning stopper, take care not to over-turn it.



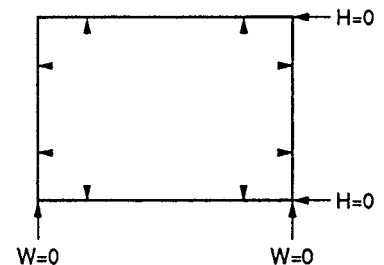
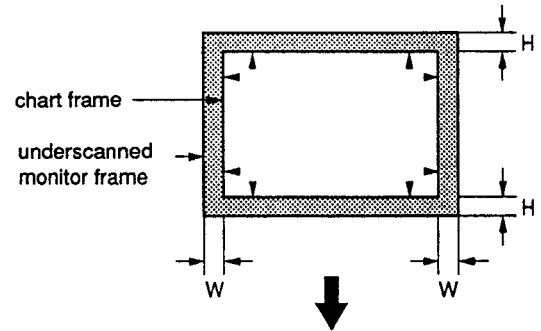
(TOP VIEW)

Potentiometer  
 Mechanical center condition

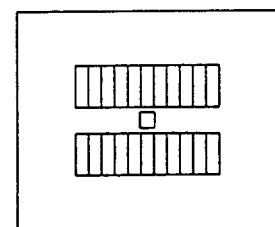
- (2) Before adjustment, be sure to allow for 10-minute warm-up time.
- (3) If the amplitude level of the measured waveform is blurred on the waveform monitor screen, set the RESPONSE switch on the waveform monitor to "LUM" mode.

- (4) Unless otherwise specified, the sentence "chart frame = underscanned monitor frame" is written about the shooting condition.

In this case, make sure that the lens is best focused. Then adjust the zoom control of the lens so that the chart frame touches the underscanned monitor frame.

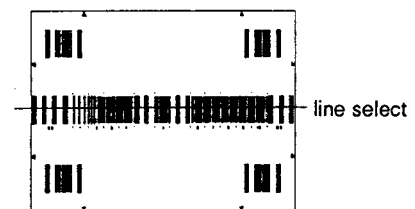


In case of the Grayscale chart:



(underscanned monitor screen)

In case of the multi-burst chart:



(underscanned monitor screen)

- (5) During the adjustment, do not touch the following switch.  
S14 (ADJ) switch/SW-724 board
- (6) Do not turn the following adjusting controls.
  - PA-185 (G) board  
    ●RV1, ●RV2
  - PA-190 (R) board  
    ●RV1, ●RV2
  - PA-191 (B) board  
    ●RV1, ●RV2
  - NR-47 board  
    ●RV1
  - IE-47 board  
    ●CV1
- (7) Confirm that the GAIN switch is set as follows.  
HIGH : 18 dB  
MID : 9 dB  
LOW : 0 dB
- (8) When replacing the CCD unit, be sure to perform the following adjustment items.
  - 3-5-1. 1H/2H Gain Adjustment
  - 3-5-2. G-ch Video Level Adjustment
  - 3-5-3. R-ch/B-ch Video Level Adjustment
 After adjustment, confirm that the Auto White Balance and Auto Black Balance should be operated exactly.

### 3-1-5. Adjustment Item

- 3-2. Before Adjustment
  - 3-2-1. Color Bar Signal
  - 3-2-2. Sensitivity Adjustment
  - 3-2-3. Gamma and Gradation Measurement
- 3-3. SYNC Signal System Adjustment
  - 3-3-1. Sub-Carrier Frequency Adjustment
  - 3-3-2. INT SC Phase Adjustment
- 3-4. Encoder System Adjustment
  - 3-4-1. Carrier Balance Adjustment
  - 3-4-2. BARS Level Adjustment
  - 3-4-3. Color Vector Adjustment
  - 3-4-4. INT CB Y Adjustment
  - 3-4-5. COMPONENT Y Level Adjustment
  - 3-4-6. R-Y Level Adjustment
  - 3-4-7. B-Y Level Adjustment
- 3-5. Video Process System Adjustment
  - 3-5-1. 1H/2H Gain Adjustment
  - 3-5-2. G-ch Video Level Adjustment
  - 3-5-3. R-ch/B-ch Video Level Adjustment
  - 3-5-4. Pedestal Level Adjustment
  - 3-5-5. Gamma Balance and Gamma Set Pre-adjustment
  - 3-5-6. R-ch/B-ch Gamma Balance Fine Adjustment
  - 3-5-7. Flare Adjustment
  - 3-5-8. MANU KNEE Adjustment
  - 3-5-9. DCC Adjustment
  - 3-5-10. White Clip Adjustment
  - 3-5-11. PRE CLIP Adjustment
  - 3-5-12. HF Offset Adjustment
  - 3-5-13. HF Aliasing Adjustment
  - 3-5-14. Aperture Adjustment
  - 3-5-15. Black Balance Adjustment
  - 3-5-16. DTL Crispening/Aliasing Adjustment
  - 3-5-17. DTL Limiter Adjustment
  - 3-5-18. H/V RATIO Adjustment
  - 3-5-19. Detail Level Adjustment
- 3-6. System control System Adjustment
  - 3-6-1. LOW LIGHT Adjustment
  - 3-6-2. Auto Iris Adjustment
  - 3-6-3. Character Size Adjustment
- 3-7. Audio System Adjustment
  - 3-7-1. Tone Level Adjustment

## 3-2. BEFORE ADJUSTMENT

### Note:

1. Before adjustment, connect the equipments referring to "3-1-2. Connection".
2. Before adjustment, Turn on POWER switch and allow for 10-minute warm-up time.

### 3-2-1. Color Bar Signal

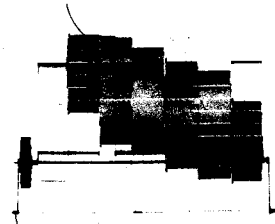
**Equipment:** Vectorscope, Waveform monitor

**Preparation:** OUTPUT switch/camera side → BARS

**Specification:**

[for NTSC]

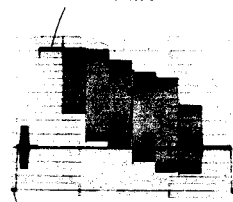
Y Level 100 IRE



SYNC Level  
-40 IRE

[for PAL]

Y Level 700 mV



SYNC Level  
300 mV

### • Chroma Level

Confirm that the beam spots of each color (R, YL, G, CY, G, B and MG) are inside the "田" mark.

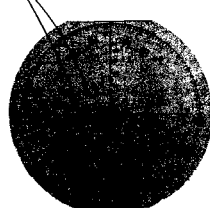
[for NTSC]

Burst Spot 75 %



[for PAL]

Burst Spot 75 %



### Note:

Partial difference between scale and signal level is caused by photographic error.

If the specifications are not met, carry out "3-4. ENCODER SYSTEM ADJUSTMENT".

### 3-2-2. Sensitivity Adjustment

**Object:** Overall white

**Light:** 3200K, 2000 lux

(If the pattern box is used, set the AUTO mode)

### Preparation:

1. Adjust the zoom control at "TELE" so that the white pattern frame matches the underscanned picture frame on the screen.
2. Lens iris → F8
3. OUTPUT switch/camera side → CAM
4. WHITE BAL switch/camera side → PRESET

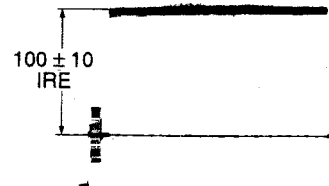
**Equipment:** Waveform monitor

**Specification:** 100 ± 10 IRE (for NTSC)

700 ± 70 mV (for PAL)

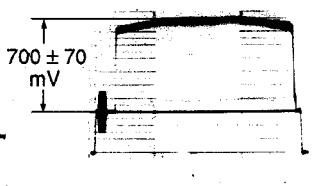
[for NTSC]

100 ± 10  
IRE



[for PAL]

700 ± 70  
mV



**Note:** If the specification is not met, perform all adjustments in "3-5. VIDEO PROCESS SYSTEM ADJUSTMENT".

### 3-2-3. Gamma and Gradation Measurement

**Object:** Grayscale chart

**Light:** Pattern box

**Equipment:** Waveform monitor

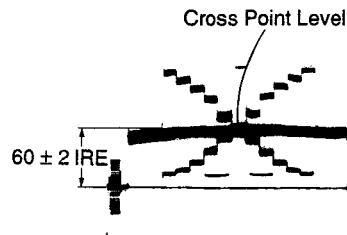
### Preparation:

1. OUTPUT switch/camera side → CAM
2. WHITE BAL switch/camera side → PRESET
3. Chart frame = Underscanned monitor frame
4. Adjust the lens iris so that the white level at grayscale waveform is 100 IRE (PAL: 700 mV).

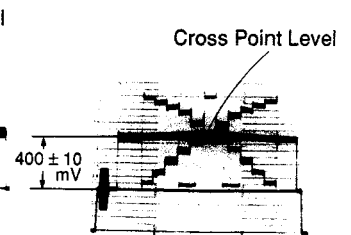
**Specification:** Cross point Level = 60 ± 2 IRE (for NTSC)

400 ± 10 mV (for PAL)

[for NTSC]



[for PAL]



### Note:

Partial difference between scale and signal level is caused by photographic error.

If the specifications are not met, carry out all adjustments in "3-5. VIDEO PROCESS SYSTEM ADJUSTMENT".

DXC-637 (UC)

DXC-637P (EK)

### 3-3. SYNC SIGNAL SYSTEM ADJUSTMENT

#### 3-3-1. Sub-Carrier Frequency Adjustment

**Equipment:** Frequency counter  
**To be extended:** EN-122 board  
**Test point:** TP1 (GND: E1)/SG-232 board  
**Adjusting point:** ⚙RV1 (SC FREQ)/SG-232 board  
**Specification:**  $3,579,545 \pm 10$  Hz (for NTSC)  
 $4,433,618 \pm 10$  Hz (for PAL)

#### 3-3-2. INT SC Phase Adjustment

**Note:**

Stated below is a procedure with the SC-H phase measuring equipment (Tektronix 1750/1751).  
 If any other equipment is used, perform adjustment at the following adjustment point by reading the instruction manual attached.

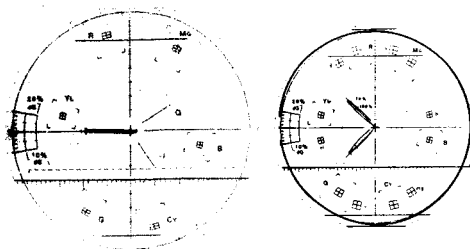
**Equipment:** SC-H Phase Equipment  
**To be extended:** SG-232 board  
**Preparation:**  
 • Disconnect the verctorscope and connect the Tektronix 1750/1751 instead.  
 • Put the Tektronix 1750/1751 to SC-H mode.  
**Test point:** VIDEO OUTconnector/camera side

**Adjustment Procedure**

- Adjust the phase relationship between SC (Burst) and H beam spot correctly with ⚙RV2 (SC-H PHASE)/SG-232 board.

[for NTSC]

[for PAL]



**Note:**

After adjustment, disconnect Tektronix 1750/1751 and connect the verctorscope.

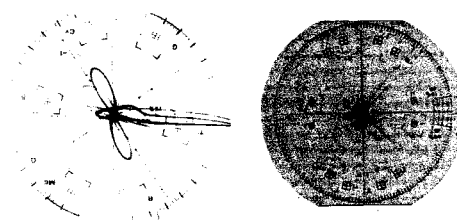
### 3-4. ENCODER SYSTEM ADJUSTMENT

#### 3-4-1. Carrier Balance Adjustment

**Equipment:** Verctorscope (MAX GAIN)  
**To be extended:** EN-122 board  
**Preparation:** OUTPUT switch/camera side → BARS  
**Adjustment Procedure**  
 • Adjust ⚙RV5 (I (V) CAL) and ⚙RV9 (Q (U) CAL)/SG-232 board so that the beam spot is in the center of the vectorscope.

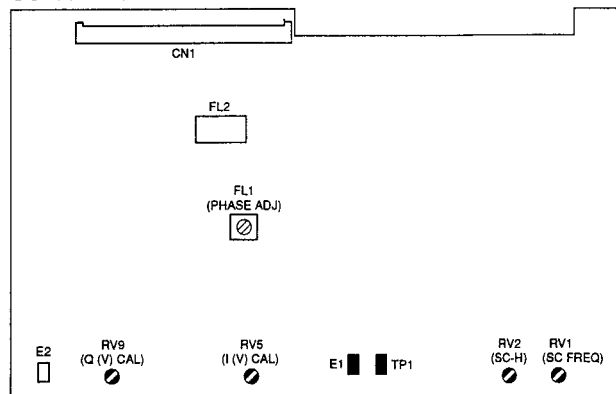
[for NTSC]

[for PAL]



#### SG-232 BOARD

#### – COMPONENT SIDE –

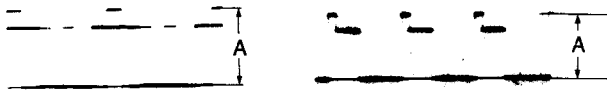


### 3-4-2. BARS Level Adjustment

**Equipment:** Oscilloscope  
**To be extended:** EN-122 board  
**Preparation:** OUTPUT switch/camera side → BARS  
**Adjusting point:** ⒶRV12 (BARS LEVEL)/EN-122 board  
**Test point:** pin A14 (GND: A16)/extension board  
**Trigger:** HD (pin B23/extension board)  
**Specification:**  $A = 1.40 \pm 0.02$  V

[for NTSC]

[for PAL]



### 3-4-3. Color Vector Adjustment

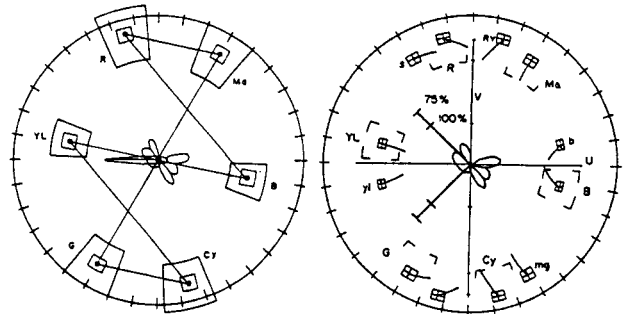
**Equipment:** Vectorscope  
**To be extended:** EN-122 board  
**Preparation:**  
 • GAIN switch/Vectorscope → 75% CAL  
 • Adjust the PHASE control on the vectorscope so that the burst spot is overlapped to the 75% axis.  
 • OUTPUT switch/camera side → BARS

#### Adjustment Procedure

1. Adjust ⒶRV6 (BURST LEVEL)/SG-232 board so that the burst spot is located at 75% scale mark on the vectorscope screen.
2. Adjust the following controls alternately so that each beam spot stays inside the reference frame "田".  
 ⒶRV7 (BURST PHASE)/SG-232 board  
 ⒶRV8 (Q (U) LEVEL)/SG-232 board  
 ⒶRV10 (CHROMA LEVEL)/SG-232 board
3. Repeat procedure 1 and 2 several times.

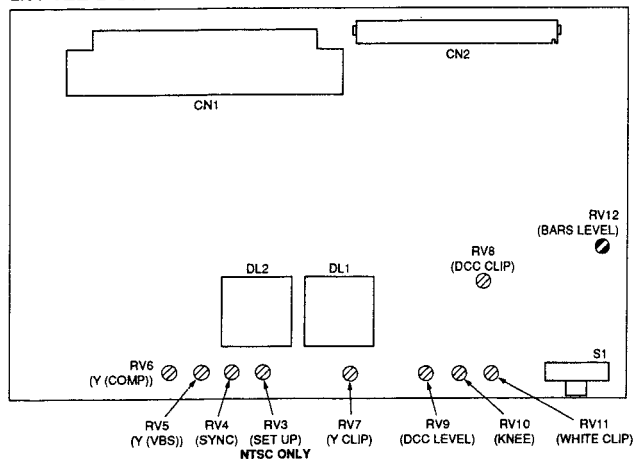
[for NTSC]

[for PAL]



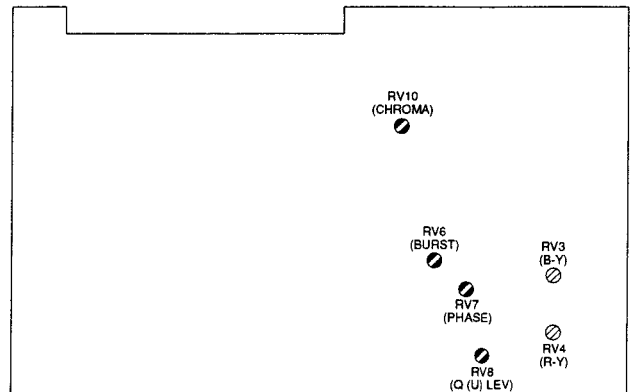
#### EN-122 BOARD

#### - COMPONENT SIDE -



#### SG-232 BOARD

#### - SOLDERING SIDE -





### 3-4-4. INT CB Y Adjustment

**Equipment:** Waveform monitor

**To be extended:** EN-122 board

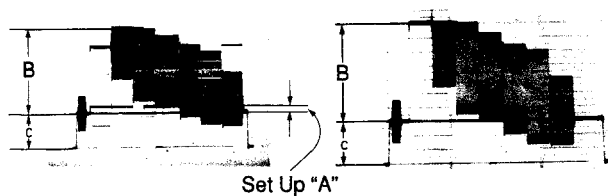
**Preparation:** OUTPUT switch/camera side → BARS

#### Adjustment Procedure

1. [NTSC model only]  
**Adjusting point:** ⒶRV3 (SET UP LEVEL)/EN-122 board  
**Specification:**  $A = 7.5 \pm 0.5$  IRE
2. **Adjusting point:** ⒶRV5 (VBS Y LEVEL)/EN-122 board  
**Specification:** [for NTSC]  $B = 75 \pm 2$  IRE  
[for PAL]  $B = 700 \pm 10$  mV
3. **Adjusting point:** ⒶRV4 (SYNC LEVEL)/EN-122 board  
**Specification:** [for NTSC]  $C = 40 \pm 2$  IRE  
[for PAL]  $C = 300 \pm 10$  mV

[for NTSC]

[for PAL]



### 3-4-5. COMPONENT Y Level Adjustment

**Equipment:** Oscilloscope

**To be extended:** EN-122 board

**Preparation:** OUTPUT switch/camera side → BARS

**Test point:** pin A14 (GND: A16)/extension board

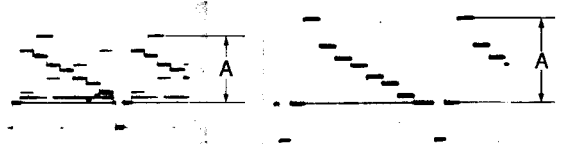
**Trigger:** HD (pin B23/extension board)

#### Adjustment Procedure

1. **Adjusting point:** ⒶRV6 (COMP Y LEVEL)/EN-122 board  
**Specification:**  $A = 714 \pm 10$  mV (for NTSC)  
 $700 \pm 10$  mV (for PAL)

[for NTSC]

[for PAL]

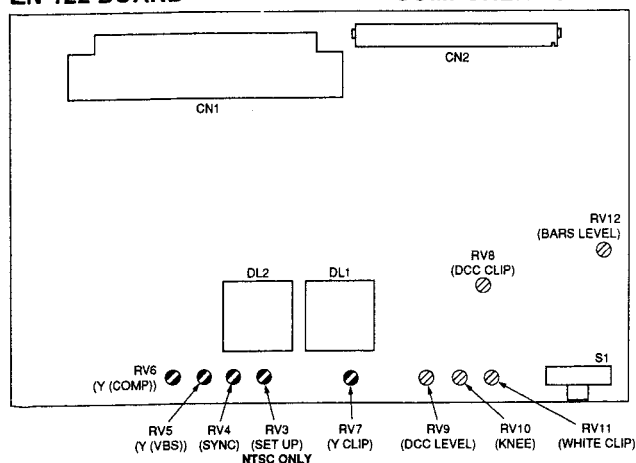


2. GAIN switch/camera side → HIGH (18 dB)

3. **Adjusting point:** ⒶRV7 (Y WHITE CLIP)/EN-122 board  
**Specification:** White Clip Level  
 $= 820 \pm 10$  mV (for NTSC)  
 $= 805 \pm 10$  mV (for PAL)

### EN-122 BOARD

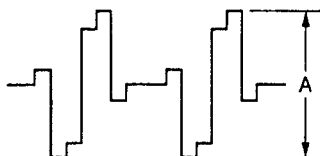
— COMPONENT SIDE —



DXC-637 (UC)  
DXC-637P (EK)

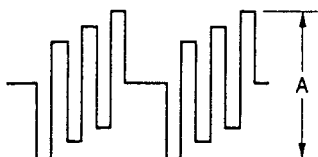
### 3-4-6. R-Y Level Adjustment

**Equipment:** Oscilloscope  
**To be extended:** EN-122 board  
**Preparation:** OUTPUT switch/camera side → BARS  
**Test point:** pin A15 (GND: A16)/extension board  
**Adjusting point:** ⚙RV4 (R-Y LEVEL)/SG-232 board  
**Specification:**  $A = 700 \pm 20$  mVp-p (for NTSC)  
 $525 \pm 20$  mVp-p (for PAL)



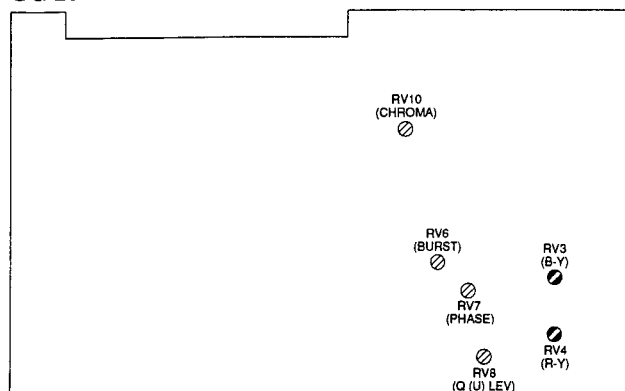
### 3-4-7. B-Y Level Adjustment

**Equipment:** Oscilloscope  
**To be extended:** EN-122 board  
**Preparation:** OUTPUT switch/camera side → BARS  
**Test point:** pin A13 (GND: A16)/extension board  
**Adjusting point:** ⚙RV3 (B-Y LEVEL)/SG-232 board  
**Specification:**  $A = 700 \pm 20$  mVp-p (for NTSC)  
 $525 \pm 20$  mVp-p (for PAL)



SG-232 BOARD

– SOLDERING SIDE –



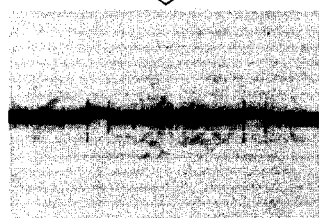
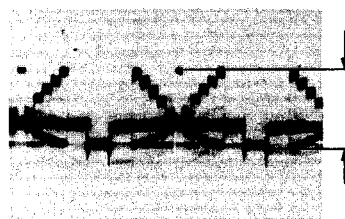
## 3-5. VIDEO PROCESS SYSTEM ADJUSTMENT

### 3-5-1. 1H/2H Gain Adjustment

**Object:** Grayscale chart  
**Equipment:** Oscilloscope  
**To be extended:** PR-209 board  
**Preparation:** WHITE BAL switch/camera side → PRESET

#### Adjustment Procedure

- Chart frame = Underscanned monitor frame
- ⚙RV13 (0H LEVEL)/IE-47 board  
→ Fully counterclockwise ⤴
- Test point:** TP3 (GND: E1)/IE-47 board  
**Adjusting point:** Lens iris  
**Specification:** White Level =  $500 \pm 10$  mVp-p
- Open the lens iris two steps.
- Test point:** TP3 (GND: E1)/IE-47 board  
**Adjusting point:** ⚙RV14 (1H LEVEL)/IE-47 board  
**Specification:** White level =  $1000 \pm 10$  mVp-p
- Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** White Level =  $100 \pm 2$  IRE (for NTSC)  
 $700 \pm 10$  mV (for PAL)
- Set the oscilloscope to GAIN ADD mode and to CH-2 INVERT mode.
- Connect CH-1 and CH-2 of oscilloscope to TP3 (GND: E1)/IE-47 board. Adjust CH2-VAR control on the oscilloscope so that the waveform becomes flat for gain correction.
- Connect CH-1 of oscilloscope to TP4 (GND: E1)/IE-47 board and CH-2 to TP3 (GND: E1)/IE-47 board.
- Adjust ⚙RV14 (1H LEVEL)/IE-47 board so that the waveform becomes flat.
- Adjust ⚙RV15 (2H LEVEL)/IE-47 board in the same manner as the procedure 3 through 6.  
**Test point:** CH1 TP4 (GND: E1)/IE-47 board  
CH2 TP2 (GND: E1)/IE-47 board



### 3-5-2. G-ch Video Level Adjustment

**Note:**

Use a reflecting grayscale chart if possible.  
Adjust the lighting so that the chart area is exactly 3200K of color temperature. Ensure that the chart is lit to 2000 lux and is 89.9 % reflectance.  
When the pattern box is used, well maintained pattern box should be used.

**Object:** Grayscale chart  
**Equipment:** Oscilloscope  
**To be extended:** PR-209 board  
**Preparation:**  
• WHITE BAL switch/camera side → PRESET  
• OUTPUT switch/camera side → CAM/DCC OFF  
**Trigger:** pin A23/extension board

**Adjustment Procedure**

1. Chart frame = Underscanned monitor frame
2. Adjust the lens iris so that the video level at pin B28 (GND:B1)/extension board is 200 mV.
3. **Test point:** pin B20 (GND:B1)/extension board  
**Adjusting point:** RV202 (G VA GAIN)/PR-209 board  
**Specification:**  $A = 500 \pm 5 \text{ mV}$



**Note:**  
Do not adjust the iris control until the “3-5-4. R-ch/B-ch Video Level Adjustment” is completed.

### 3-5-3. R-ch/B-ch Video Level Adjustment

**Note:**

Be sure that “3-5-3. G-ch Video Level Adjustment” is completed.

**Object:** Grayscale chart  
**Equipment:** Oscilloscope  
**To be extended:** PR-209 board  
**Preparation:**  
• WHITE BAL switch/camera side → PRESET  
• OUTPUT switch/camera side → CAM/DCC OFF  
**Trigger:** pin A23/extension board

**Adjustment Procedure**

1. Perform adjustment on order of R-ch and B-ch as shown below.
2. Chart frame = Underscanned monitor frame
3. Connect CH-1 of oscilloscope to TP502 (GND: E1)/PR-209 board, and make sure that the video level is  $500 \pm 5 \text{ mV}$ .
4. Connect CH-2 of oscilloscope to following Test point, and adjust the following adjusting control so that the video level is about 500 mV.

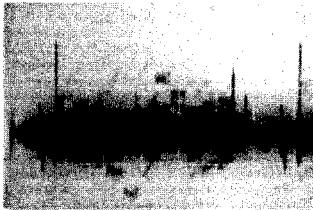
Extension board (PR-209 board)

	CH-2 of Oscilloscope	Adjusting point
R-ch	pin B21 (GND:B1)	RV103 (R VA GAIN)
B-ch	pin B19 (GND:B1)	RV302 (B VA GAIN)

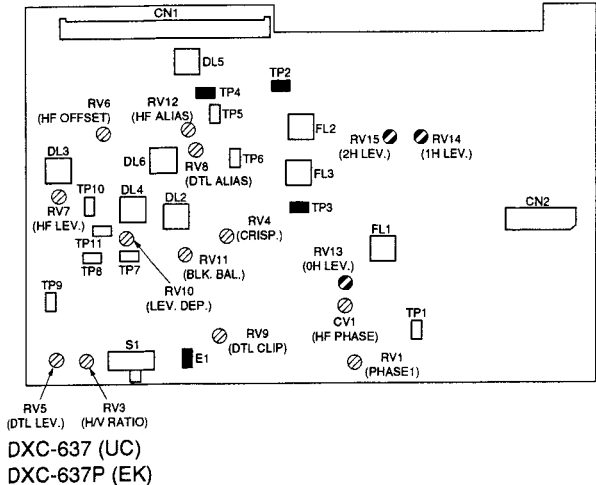
5. Set the oscilloscope to GAIN ADD mode and CH-2 INVERT mode.
6. Adjust the following adjusting control so that the waveform becomes flat.

PR-209 board

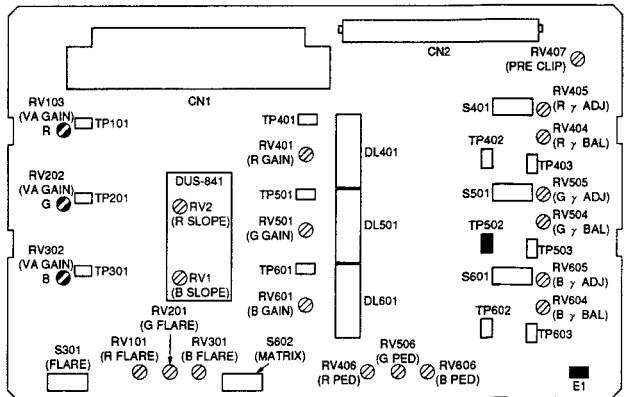
	Adjusting point
R-ch	RV103 (R VA GAIN)
B-ch	RV302 (B VA GAIN)



### IE-47 BOARD – COMPONENT SIDE –



### PR-209/DUS-841 BOARD – COMPONENT SIDE –



### 3-5-4. Pedestal Level Adjustment

**Lens iris:** Close "C"  
**Equipment:** Oscilloscope,  
 Vectorscope (MAX GAIN)

**To be extended:** PR-209 board

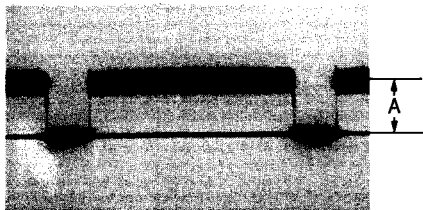
#### Preparation:

- GAIN switch/camera side → 0 dB
- S14(ADJ)/SW-724 board → "ON"

**Test point:** TP503(GND:E1)/PR-209 board

#### Adjustment Procedure

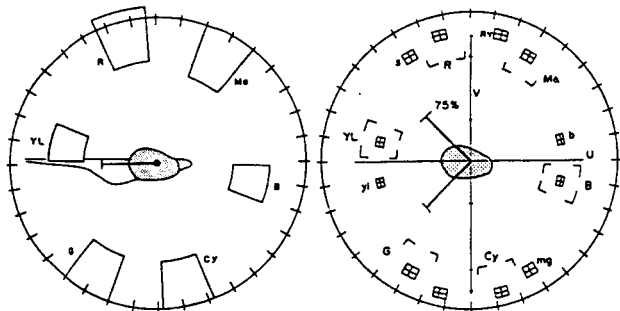
1. **Test point:** TP503(GND:E1)/PR-209 board  
**Adjusting point:** RV506(G PED)/PR-209 board  
**Specification:** Pedestal Level "A"  
 =  $25 \pm 2$  mV (for NTSC)  
 =  $30 \pm 2$  mV (for PAL)



2. Adjust RV406 (R PED) and RV606 (B PED)/PR-209 board so that the black beam spot is in the center of the vectorscope.

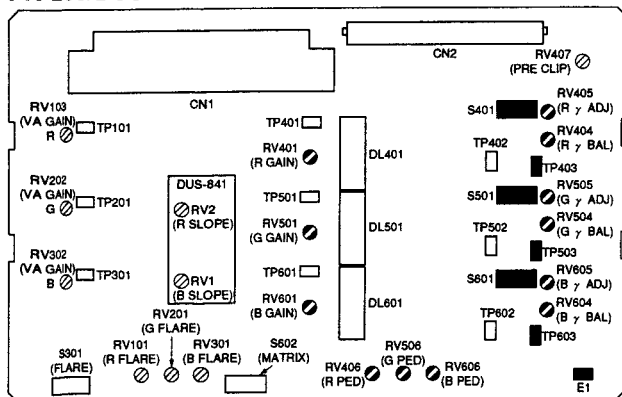
[for NTSC]

[for PAL]



PR-209/DUS-841 BOARD

— COMPONENT SIDE —



### 3-5-5. Gamma Balance and Gamma Set Pre-adjustment

**Object:** Grayscale chart  
**Equipment:** Oscilloscope, Waveform monitor,  
 Vectorscope

**To be extended:** PR-209 board

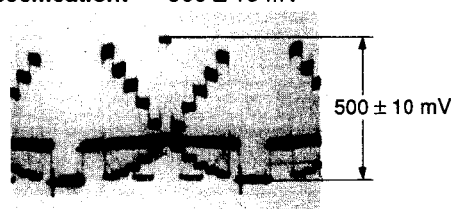
#### Preparation:

- GAIN switch/camera side → 0 dB
- WHITE BAL switch/camera side → A

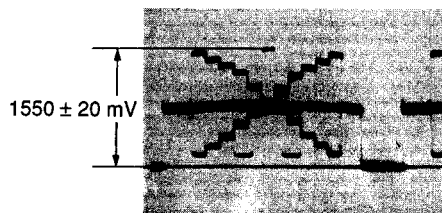
**Trigger:** pin A24/extension board

#### Adjustment Procedure

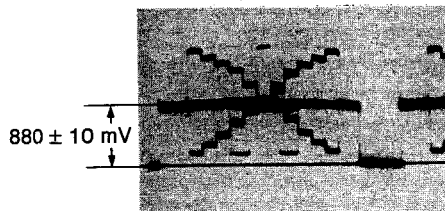
1. Chart frame = Underscanned monitor frame
2. **Test point:** pin B20 (GND:B1)/extension board  
**Adjusting point:** Lens iris  
**Specification:**  $500 \pm 10$  mV



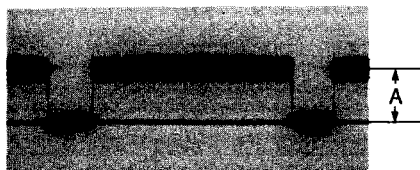
3. Connect the probe of oscilloscope to TP503 (GND: E1)/PR-209 board.
4. S501 (G γ SW) /PR-209 board→"OFF"
5. Adjust RV501 (G GAIN)/PR-209 board so that the white level is  $1550 \pm 20$  mV.
6. S501 (G γ SW) /PR-209 board→"ON"
7. Adjust RV504 (G γ BAL)/PR-209 board so that the white level is  $1550 \pm 20$  mV.
8. Connect the probe of oscilloscope to TP403 (GND: E1)/PR-209 board.
9. S401 (R γ SW) /PR-209 board→"OFF"
10. Adjust RV401 (R GAIN)/PR-209 board so that the white level is  $1550 \pm 20$  mV.
11. S401 (R γ SW) /PR-209 board→"ON"
12. Adjust RV404 (R γ BAL)/PR-209 board so that the white level is  $1550 \pm 20$  mV.
13. Connect the probe of oscilloscope to TP603 (GND: E1)/PR-209 board.
14. S601 (B γ SW) /PR-209 board→"OFF"
15. Adjust RV601 (B GAIN)/PR-209 board so that the white level is  $1550 \pm 20$  mV.
16. S601 (B γ SW) /PR-209 board→"ON"
17. Adjust RV604 (B γ BAL)/PR-209 board so that the white level is  $1550 \pm 20$  mV.



18. **Test point:** TP503 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV505 (G GAMMA)/PR-209 board  
**Specification:** Cross point level =  $880 \pm 10$  mV
19. **Test point:** TP403 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV405 (R GAMMA)/PR-209 board  
**Specification:** Cross point level =  $880 \pm 10$  mV
20. **Test point:** TP603 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV605 (B GAMMA)/PR-209 board  
**Specification:** Cross point level =  $880 \pm 10$  mV



21. Cover the lens with lens cap.
22. **Test point:** TP503 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV506 (G PED)/PR-209 board  
**Specification:** Pedestal level "A"  
 $= 25 \pm 5$  mV (for NTSC)  
 $= 30 \pm 5$  mV (for PAL)
23. **Test point:** TP403 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV406 (R PED)/PR-209 board  
**Specification:** Pedestal level "A"  
 $= 25 \pm 5$  mV (for NTSC)  
 $= 30 \pm 5$  mV (for PAL)
24. **Test point:** TP603 (GND:E1)/PR-209 board  
**Adjusting point:** ⚙RV606 (B PED)/PR-209 board  
**Specification:** Pedestal level "A"  
 $= 25 \pm 5$  mV (for NTSC)  
 $= 30 \pm 5$  mV (for PAL)



25. Remove the lens cap.
26. Repeat procedure 3 to 25 several times.
27. Do not adjust the iris control and proceed to "3-5-6. R-ch/B-ch Gamma Balance Fine Adjustment".

### 3-5-6. R-ch/B-ch Gamma Balance Fine Adjustment

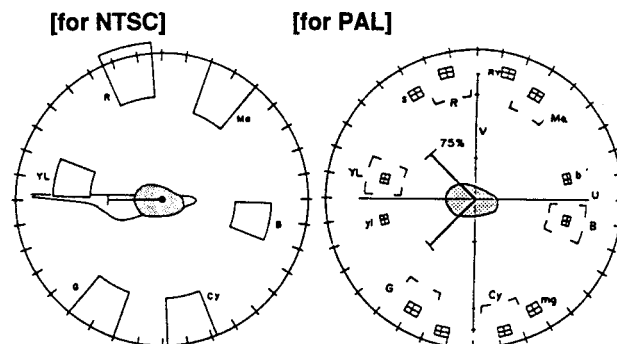
#### Note:

Be sure that "3-5-5. Gamma Balance and Gamma Set Pre-adjustment" is completed.

**Object:** Grayscale chart  
**Equipment:** Oscilloscope,  
 Vectorscope (MAX GAIN)  
**To be extended:** PR-209 board

#### Adjustment Procedure

1. Chart frame = Underscanned monitor frame
2. Confirm that the video level at TP502 (GND: E1)/PR-209 board is  $500 \pm 10$  mV.
3. **Test point:** VIDEO OUT  
**Adjusting point:** ⚙RV405 (R GAMMA ADJ)/PR-209 board  
 ⚙RV605 (B GAMMA ADJ)/PR-209 board  
**Adjustment:** Adjust the above controls alternately so that the beam spot is in the center on the vectorscope screen.



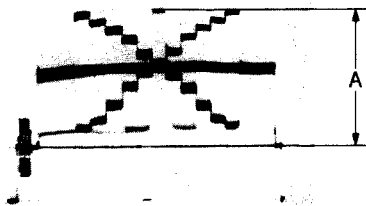
4. **Test point:** VIDEO OUT  
**Adjusting point:** ⚙RV404 (R GAMMA BAL)/PR-209 board  
 ⚙RV604 (B GAMMA BAL)/PR-209 board  
**Adjustment:** Adjust the above controls alternately so that the beam spot is in the center on the vectorscope screen.
5. Cover the lens with lens cap.
6. **Test point:** VIDEO OUT  
**Adjusting point:** ⚙RV406 (R PED)/PR-209 board  
 ⚙RV606 (B PED)/PR-209 board  
**Adjustment:** Adjust the above controls alternately so that the beam spot is in the center on the vectorscope screen.

### 3-5-7. Flare Adjustment

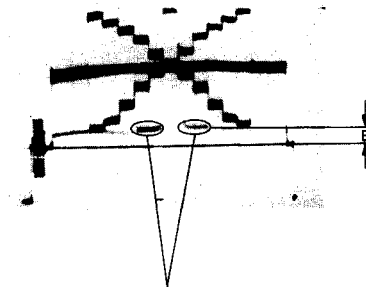
**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**extension board:** PR-209 board  
**Preparation:**  
 S301 (FLARE ON/OFF)/PR-209 board → ON

#### Adjustment Procedure

1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 100 \pm 2$  IRE (for NTSC)  
 $700 \pm 10$  mV (for PAL)

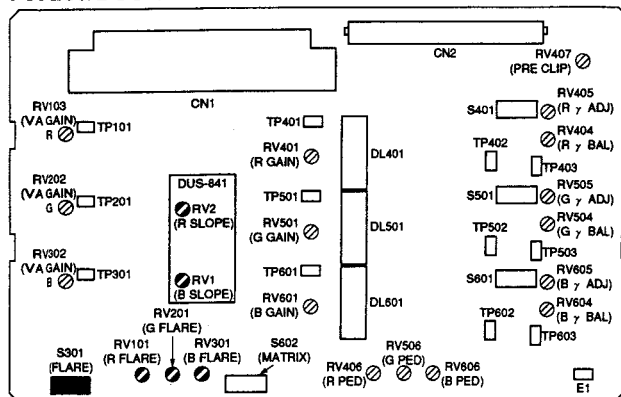


3. Open the lens iris by one step.
4. Adjust the following adjusting controls alternately so that the level "B" is maximum and the carrier leakage is minimum.
  - RV201 (G FLARE)/PR-209 board
  - RV101 (R FLARE)/PR-209 board
  - RV301 (B FLARE)/PR-209 board



Carrier Leakage to Mimimum

#### PR-209/DUS-841 BOARD – COMPONENT SIDE –



### 3-5-8. MANU KNEE Adjustment

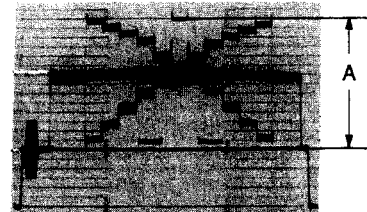
**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**To be extended:** PR-209 board, EN-122 board  
**Preparation:**

- GAIN switch/camera side → MID (9 dB)
- WHITE BAL switch/camera side → PRESET

#### Adjustment Procedure

1. Turn the following adjusting controls fully clockwise ⌚.
  - RV10 (MANU KNEE)/EN-122 board
  - RV1 (B PRE SLOPE)/DUS-841 board
  - RV2 (R PRE SLOPE)/DUS-841 board

2. **To be extended:** EN-122 board
3. Chart frame = Underscanned monitor frame
4. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 102 \pm 1$  IRE (for NTSC)  
 $715 \pm 10$  mV (for PAL)



5. Turn RV10 (MANU KNEE)/EN-122 board counterclockwise slowly from fully clockwise and stop where the level "A" at VIDEO OUT connector becomes  $100 \pm 1$  IRE (for PAL:  $700 \pm 7$  mV).

**Note:** After adjustment, carry out "3-5-9. DCC Adjustment".

### 3-5-9. DCC Adjustment

**Object:** Grayscale chart

**Equipment:** Waveform monitor

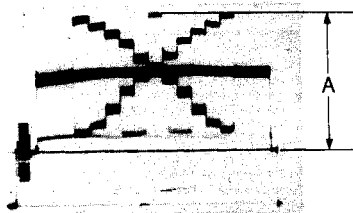
**To be extended:** EN-122 board, PR-209 board

**Preparation:**

- GAIN switch/camera side → 0 dB
- WHITE BAL switch/camera side → PRESET
- OUTPUT switch/camera side → CAM/DCC ON

#### Adjustment Procedure

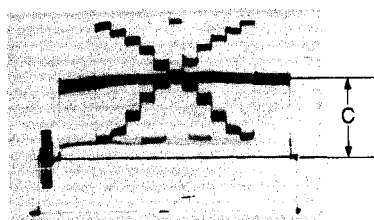
1. **To be extended:** EN-122 board
2. Chart frame = Underscanned monitor frame
3. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 102 \pm 1$  IRE (for NTSC)  
 $715 \pm 10$  mV (for PAL)



4. **Test point:** VIDEO OUT  
**Adjusting point:** RV9 (DCC LEVEL)/EN-122 board  
**Specification:**  $B = 100 \pm 1$  IRE (for NTSC)  
 $700 \pm 10$  mV (for PAL)

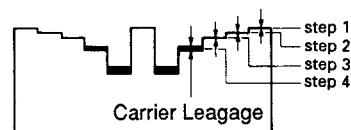


5. GAIN switch/camera side → MID (9 dB)
6. **Test point:** VIDEO OUT  
**Adjusting point:** RV8 (DCC CLIP)/EN-122 board  
**Specification:**  $C = 92 \pm 1$  IRE (for NTSC)  
 $645 \pm 10$  mV (for PAL)

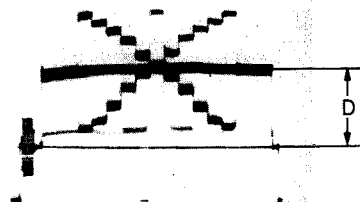


7. **To be extended:** PR-209 board
8. GAIN switch/camera side → 0 dB
9. Open the lens iris by 3.5 steps.
10. Alternately readjust the following adjusting controls so that the carrier leakage level of step 1 is minimum.

- RV1 (B PRE SLOPE)/DUS-841 board
- RV2 (R PRE SLOPE)/DUS-841 board

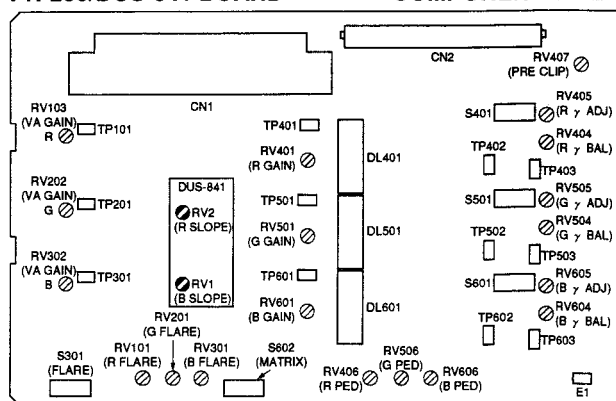


11. OUTPUT switch/camera side → CAM/DCC OFF
12. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** Cross point Level "D"  
 $= 100 \pm 1$  IRE (for NTSC)  
 $700 \pm 10$  mV (for PAL)
13. Confirm that Cross point Level "D" is  $93 \pm 2$  IRE (for PAL:  $650 \pm 10$  mV) when OUTPUT switch/camera side is set to CAM/DCC ON.



#### PR-209/DUS-841 BOARD

#### – COMPONENT SIDE –



### 3-5-10. White Clip Adjustment

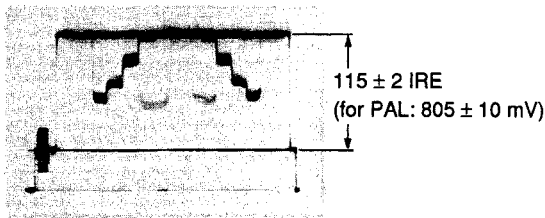
**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**To be extended:** PR-209 board

**Preparation:**

- WHITE BAL switch/camera side → PRESET
- GAIN switch/camera side → 0 dB
- OUTPUT switch/camera side → CAM/DCC OFF

**Adjustment Procedure**

1. Chart frame = Underscanned monitor frame
2. Lens iris → Open
3. Adjust RV11/EN-122 board so that the white level at VIDEO OUT is  $115 \pm 2$  IRE (for PAL:  $805 \pm 10$  mV).



4. Confirm that the white clip level is 113 to 117 IRE (for PAL: 790 to 820 mV) when OUTPUT switch on the camera side is set to CAM/DCC ON.

### 3-5-11. PRE CLIP Adjustment

**Note:**

Perform this adjustment only when the carrier leakage level is 2 IRE or more (for PAL: 10 mV or more) with shooting the grayscale chart and setting GAIN switch on camera side to 18 dB.

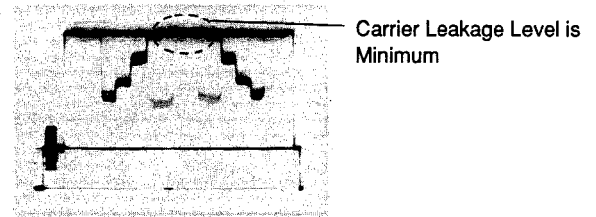
**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**To be extended:** PR-209 board

**Preparation:**

- WHITE BAL switch/camera side → PRESET
- GAIN switch/camera side → 18 dB

**Adjustment Procedure**

1. Chart frame = Underscanned monitor frame
2. Lens iris → Open
3. Adjust RV407/PR-209 board so that the carrier leakage level of the grayscale waveform at the VIDEO OUT is minimum.



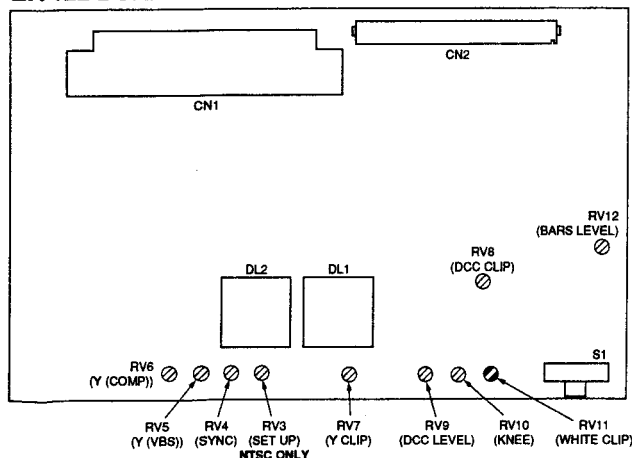
4. Repeat "3-5-10. White Clip Adjustment" and "3-5-11. PRE CLIP Adjustment" until the specification is met.

**Note:** After adjustment, set as follows.

GAIN switch/camera side → 0 dB

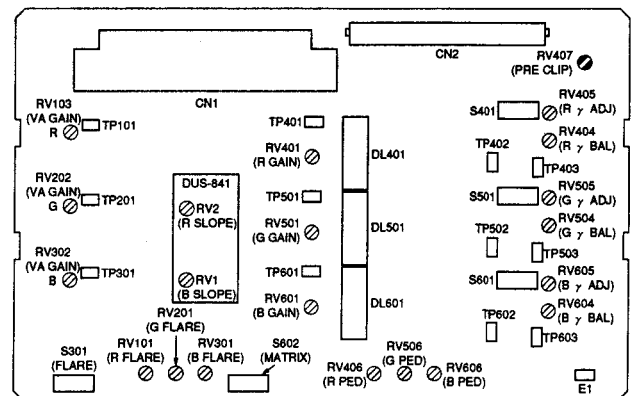
#### EN-122 BOARD

#### - COMPONENT SIDE -



#### PR-209/DUS-841 BOARD

#### - COMPONENT SIDE -



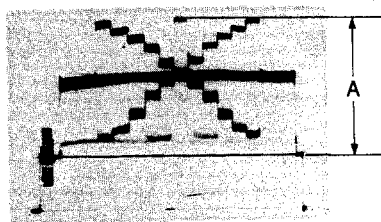


### 3-5-12. HF Offset Adjustment

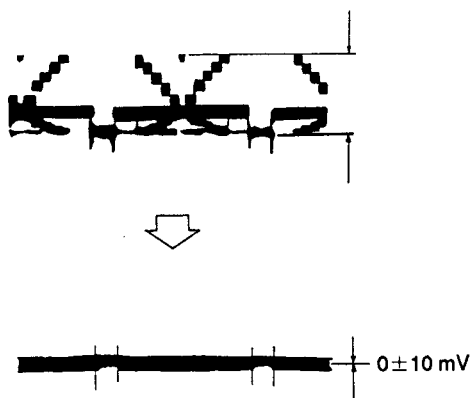
**Object:** Grayscale chart  
**Equipment:** Oscilloscope, Waveform monitor  
**To be extended:** PR-209 board

#### Adjustment Procedure

1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** White peak Level "A"  
 $= 100 \pm 2$  IRE (for NTSC)  
 $= 700 \pm 10$  mV (for PAL)



3. Adjust  $\odot$ RV6 (HF OFFSET)/IE-47 board so that the DC offset level at TP10 (GND: E1)/IE-47 board is  $0 \pm 10$  mV.



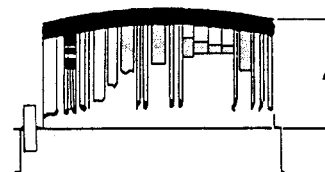
### 3-5-13. HF Aliasing Adjustment

**Object:** Multi-burst chart  
**Equipment:** Waveform monitor  
**Preparation:**

- $\odot$ RV5 (DTL LEVEL)/IE-47 board → Fully clockwise  $\odot$
  - $\odot$ RV7 (HF LEVEL)/IE-47 board → Fully clockwise  $\odot$
- Test point:** VIDEO OUT

#### Adjustment Procedure

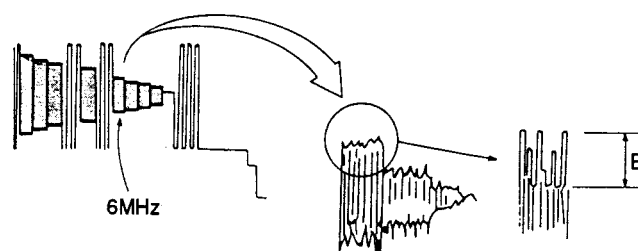
1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 80 \pm 2$  IRE (for NTSC)  
 $560 \pm 10$  mV (for PAL)



3. **Adjusting point:**  $\odot$ RV12 (HF ALIAS)/IE-47 board

**Specification:** B = Minimum

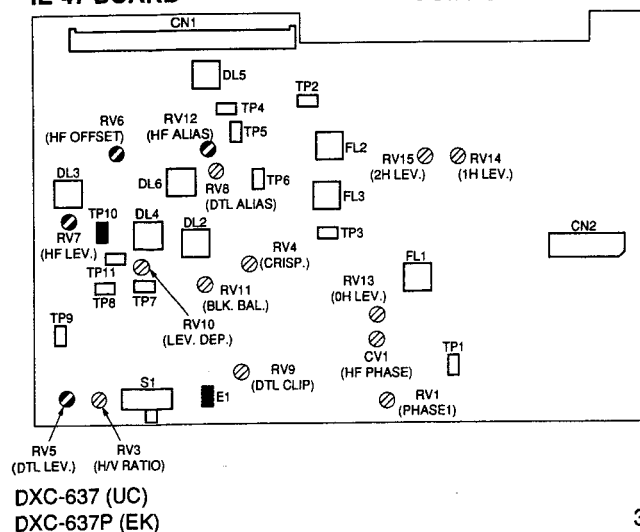
(To get the following picture, set the LINE SEL switch on the waveform monitor to "15 LINES". Select the center of the monitor screen by using the VAR control of LINE SEL.)



**Note:** After adjustment, carry out "3-5-16. DTL Crispening/ Aliasing Adjustment".

#### IE-47 BOARD

#### - COMPONENT SIDE -



### 3-5-14. Aperture Adjustment

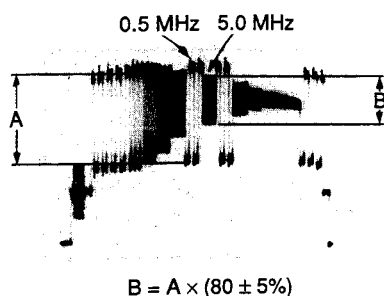
**Object:** Multi-burst chart  
**Equipment:** Waveform monitor  
**To be extended:** PR-209 board  
**Preparation:** S1 (DTL)/IE-47 board → OFF

#### Adjustment Procedure

- Chart frame = Underscanned monitor frame
- Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** 0.5 MHz Level "A"  
 $= 100 \pm 2$  IRE (for NTSC)  
 $= 700 \pm 10$  mV (for PAL)

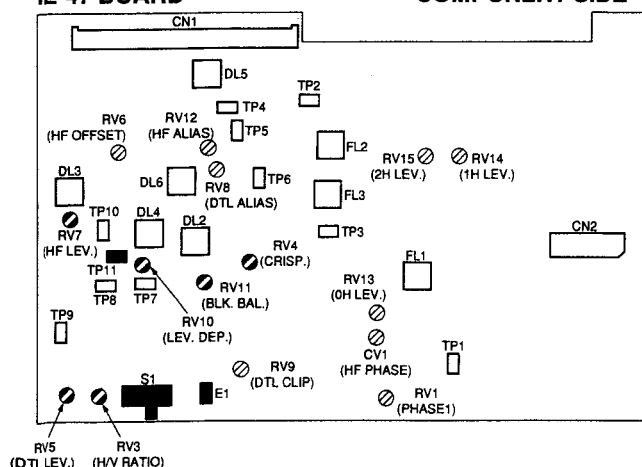


- Adjust RV7 (HF LEVEL)/IE-47 board so that the ratio of 5 MHz level "B" at VIDEO OUT connector to 0.5 MHz level "A" is  $80 \pm 5\%$ .  
 (To get the following picture, set the LINE SEL switch on the waveform monitor to "15 LINES". Adjust the VAR control of LINE SEL.)



#### IE-47 BOARD

#### — COMPONENT SIDE —



### 3-5-15. Black Balance Adjustment

**Object:** Grayscale chart  
**Equipment:** Oscilloscope, Waveform monitor  
**To be extended:** PR-209 board  
**Preparation:**

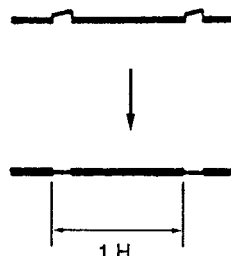
- S1 (DTL ON/OFF)/IE-47 board → "ON"
  - RV3 (H/V RATIO)/IE-47 board → Mechanical center
  - RV4 (CRISPENING)/IE-47 board → Fully clockwise
  - RV5 (DTL LEVEL)/IE-47 board → Fully clockwise
  - RV10 (LEVEL DEP)/IE-47 board → Fully counterclockwise
- (RV10/IE-47 board is kept to fully counterclockwise.)  
 (RV10/IE-47 board is not used any adjustment item.)

#### Adjusting point

- Chart frame = Underscanned monitor frame
- Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 100m \pm 2$  IRE (for NTSC)  
 $700 \pm 10$  mV (for PAL)



- Test point:** TP11 (GND: E1)/IE-47 board  
**Adjusting point:** RV11 (BLACK BAL)/IE-47 board





### 3-5-17. DTL Limiter Adjustment

**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**To be extended:** IE-47 board

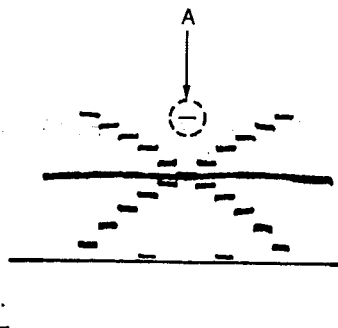
**Preparation:**

- S1 (DTL ON/OFF)/IE-47 board → "ON"
- RV3 (H/V RATIO)/IE-47 board → Mechanical center
- RV5 (DTL LEVEL)/IE-47 board → Fully clockwise ⌚
- RV9 (DTL CLIP)/IE-47 board  
→ Fully counterclockwise ⌚

**Test point:** VIDEO OUT connector/camera side

**Adjustment Procedure**

1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** White Level =  $90 \pm 2$  IRE (for NTSC)  
 $630 \pm 10$  mV (for PAL)
3. Turn RV9 (DTL CLIP)/IE-47 board clockwise slowly and stop where the spike at portion "A" becomes 2/3 of its maximum size.



### 3-5-18. H/V RATIO Adjustment

**Note:** Be sure that "3-5-16. DTL Crispning/Aliasing Adjustment is completed.

**Object:** Grayscale chart  
**Equipment:** B/W monitor screen  
**Preparation:** WHITE BAL switch/camera side → PRESET

**Test point:** VIDEO OUT

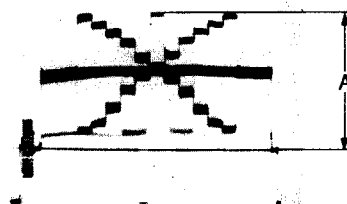
**Adjusting point:** RV3 (H/V RATIO)/IE-47 board

**Adjustment Procedure**

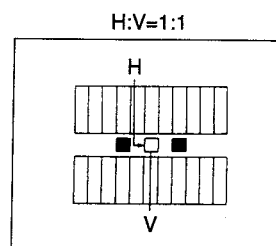
1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT

**Adjusting point:** Lens iris

**Specification:**  $A = 80 \pm 2$  IRE (for NTSC)  
 $560 \pm 10$  mV (for PAL)



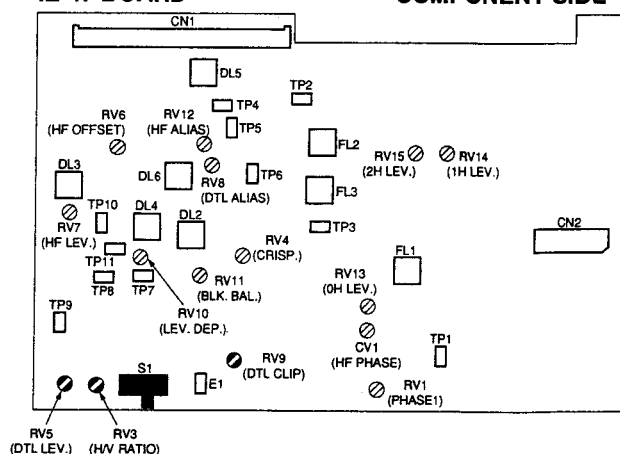
3. Observing the point indicated on the B/W monitor (See the figure below), adjust RV3 (H/V RATIO)/IE-47 board so that both horizontal and vertical detail levels are equal.



**Note:** After adjustment, carry out "3-5-19. Detail Level Adjustment".

### IE-47 BOARD

### - COMPONENT SIDE -



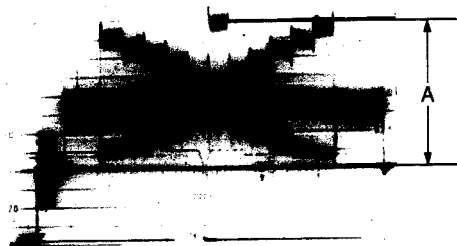
### 3-5-19. Detail Level Adjustment

**Note:** Be sure that "3-5-18. H/V RATIO Adjustment" is completed.

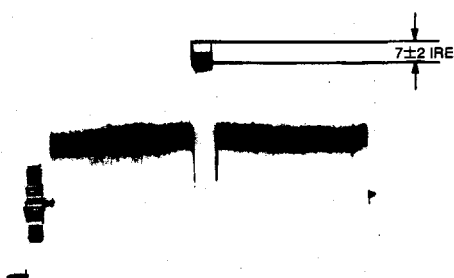
**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**Preparation:** WHITE BAL switch/camera side → PRESET

**Test point:** VIDEO OUT  
**Adjusting point:** RV5 (DTL LEVEL)/IE-47 board  
**Adjustment Procedure**

1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:**  $A = 80 \pm 2$  IRE (for NTSC)  
 $560 \pm 10$  mV (for PAL)



3. Adjust "LINE SELECTOR (15 LINES)" of waveform monitor so that a selected line is overlapped with white level of the grayscale chart of pattern box on the waveform monitor. Adjust RV5 (DTL LEVEL)/IE-47 board so that the DTL level is  $7 \pm 2$  IRE (for PAL:  $50 \pm 5$  mV).  
**Note:** If the two DTL levels are not balanced, take the bigger one.



- Note:** If the grayscale chart is reflection type, the DTL level is  $11 \pm 2$  IRE (for PAL:  $77 \pm 10$  mV).
4. Repeat "3-5-18. H/V RATIO Adjustment" and Detail Level Adjustment several times.

## 3-6. SYSTEM CONTROL SYSTEM ADJUSTMENT

### 3-6-1. Low Light Adjustment

**Object:** Grayscale chart  
**Equipment:** Waveform monitor  
**Preparation:**  
• WHITE BAL switch/camera side → PRESET  
• Press the DISP CHG switch several times until the following display appears on the viewfinder screen.

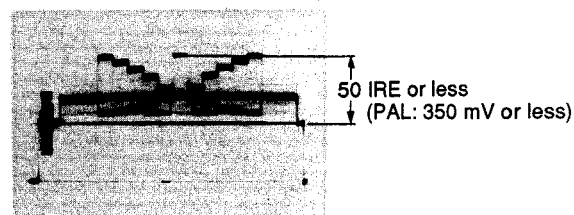
Applied Menu at 3 page

"ADVANCED MENU3"	
• LL	IND: ON
IRIS	IND: ON
GAIN	IND: ON
FILTER	IND: ON
MIC	IND: ON
AUDIO	IND: ON
TAPE	IND: ON
IC	IND: ON

**Adjusting point:** RV4 (LOW LIGHT IND SET)/SW-724 board

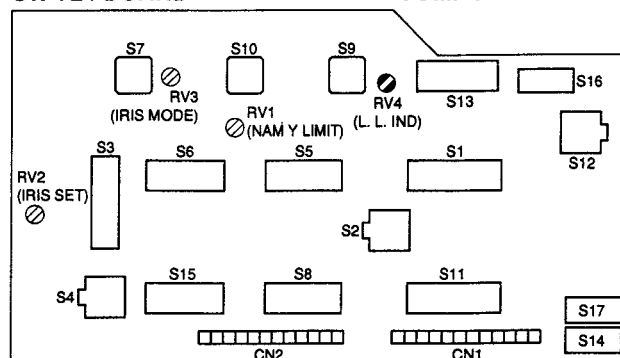
#### Adjustment Procedure

1. Chart frame = Underscanned monitor frame
2. **Test point:** VIDEO OUT  
**Adjusting point:** Lens iris  
**Specification:** White Level  
 $= 42 \pm 5$  IRE (for NTSC)  
 $= 295 \pm 30$  mV or less (for PAL)
3. Rotate RV4 (LOW LIGHT IND SET)/SW-724 board slowly counterclockwise from the rightmost position until the point where the "LOW LIGHT" indication on the viewfinder screen.
4. Open the iris control gradually and confirm that the white level of the video signal is 50 IRE or less (for PAL: 350 mV or less) when the "LOW LIGHT" indication disappears. If the specification is not met, repeat procedure 3.



#### SW-724 BOARD

#### - COMPONENT SIDE -



### 3-6-2. Auto Iris Adjustment

**Object:** Grayscale chart, White portion of pattern box

**Equipment:** Waveform monitor

**Preparation:**

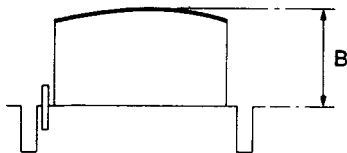
- WHITE BAL switch/camera side → PRESET
- Lens iris AUTO/MANUAL → AUTO
- RV3 (IRIS MODE)/SW-724 board → Fully clockwise

#### Adjustment Procedure

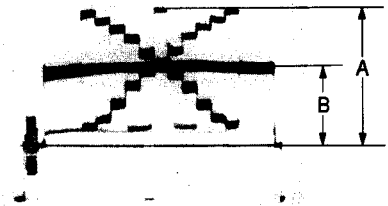
1. Chart frame = Underscanned monitor frame
2. Adjust RV2 (IRIS SET)/SW-724 board so that the white peak level "A" is  $73 \pm 1$  IRE (for PAL:  $510 \pm 7$  mV).
3. Adjust RV3 (IRIS MODE)/SW-724 board so that the white peak level of grayscale is  $100 \pm 1$  IRE (for PAL:  $700 \pm 7$  mV).



4. Remove the grayscale chart from the pattern box, and shoot the white portion of the pattern box with the lens zoom set fully to TELE.
5. Confirm that the white peak level "B" is  $73 \pm 3$  IRE (for PAL:  $510 \pm 20$  mV).



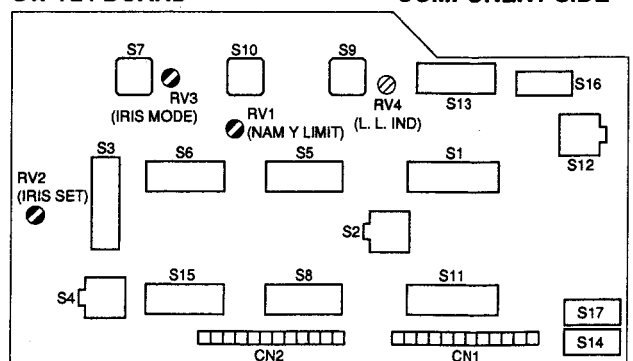
6. Press AUTO IRIS (BACK L) button on camera side.
7. Adjust RV1 (NAM Y LIMIT)/SW-724 board so that the cross point level "C" at grayscale is  $75 \pm 5$  IRE (for PAL:  $525 \pm 35$  mV).



8. Confirm that the peak level "A" at grayscale is  $80 \pm 5$  IRE (for PAL:  $560 \pm 35$  mV) when AUTO IRIS (SPOT L) button on camera side is pressed.
9. After adjustment, perform as follows.
  - Re-press AUTO IRIS (BACK L) button so that the AUTO IRIS (BACK L) mode is no available.
  - Re-press AUTO IRIS (SPOT L) button so that the AUTO IRIS (SPOT L) mode is no available.
  - Lens iris AUTO/MANUAL → MANUAL

#### SW-724 BOARD

#### - COMPONENT SIDE -



### 3-6-3. Character Size Adjustment

**Test point:** Viewfinder screen

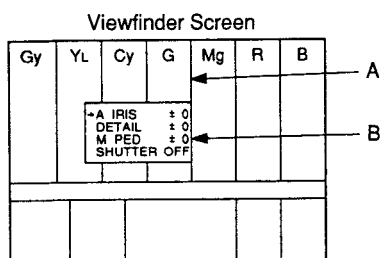
**Preparation:**

- OUTPUT switch/camera side → BARS
- DISP CHG switch/camera side → ON

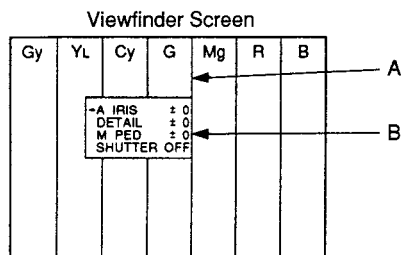
#### Adjustment Procedure

- Adjust  $\odot$ CV1 (CHR SIZE)/AT-93 board so that the "B" line on white block for character display matches the "A" line (Border between Mg and R) on color bar screen.

[for NTSC]



[for PAL]



### 3-7. AUDIO SYSTEM ADJUSTMENT

#### 3-7-1. Tone Level Adjustment

**Equipment:** Oscilloscope

**Preparation:**

- OUTPUT switch/camera side → BARS
- Press the DISP CHG switch several times until the following display appears on the viewfinder screen. Set the TONE in the menu to ON.

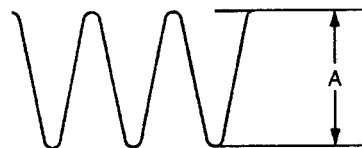
Applied Menu at 2 page

"ADVANCED MENU2"	
→ TONE	: ON
DCC+	: ON
VF S DTL	: ON
EZ MODE	: STD
AWB MEM	: 2
BARS	: SMPTE
EVS	: OFF

**Test point:** TP1/AA-81 board

**Adjusting point:**  $\odot$ RV1 (TONE LEVEL)/AA-81 board

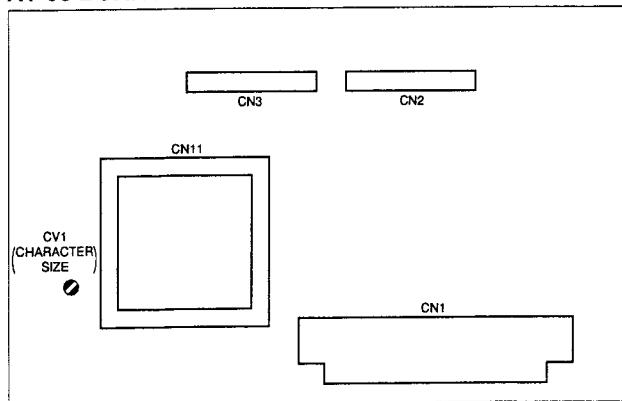
**Specification:** A =  $600 \pm 15$  mV



**Note:** After adjustment, set the TONE in the menu to OFF.

#### AT-93 BOARD

– SOLDERING SIDE –



#### AA-81 BOARD – COMPONENT SIDE –

